WETLAND INVENTORY UPDATE
YEAR 9 SYNTHESIS REPORT
2013

March 2014
Water Resources Division
Lummi Natural Resources Department
Lummi Indian Business Council

This page intentionally left blank.

LUMMI NATION

WETLAND INVENTORY UPDATE
YEAR 9 SYNTHESIS REPORT
2013

Prepared for:
Lummi Indian Business Council (LIBC)

Funded by:
U.S. Environmental Protection Agency
(Assistance Agreement No. BG-00J13401-3)

Prepared by:
Water Resources Division
Lummi Natural Resources Department
and
Northwest Ecological Services, LLC

Authors:
Frank Lawrence III, LIBC Natural Resources Specialist
Analiese Burns, PWS, Northwest Ecological Services
Molly Porter, PWS, Northwest Ecological Services

Contributors:
Gerry Gabrisch, GIS Manager
Jeremy Freimund, P.H., Water Resources Manager

March 2014

This project has been funded wholly or in part by the United States Environmental Protection Agency under Assistance Agreement BG-00J13401-3 to the Lummi Nation. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

TABLE OF CONTENTS

This page intentionally left blank.

1.0 INTRODUCTION

The Lummi Indian Reservation (Reservation) is located along the western boundary of Whatcom County, Washington and includes the mouth of the Nooksack and Lummi Rivers (Figure 1). Both the Nooksack and Lummi River Watersheds are under environmental pressures from rapid regional growth. The Lummi Nation has also entered a period of rapid economic development under self-governance. Growth on and near the Reservation requires that the Nation's core environmental program prioritize the development of a regulatory infrastructure that is technically sound, legally defensible, and administratively efficient and allows for growth while protecting tribal resources and the Reservation environment. This regulatory infrastructure supports both the tribal goal and the Environmental Protection Agency (EPA) policy of tribal self governance and recognition of sovereignty.

Previous EPA and other funding sources have supported the Lummi Nation's assessment of priority water resource needs and the identification of unmet needs. Environmental planning intended to protect the Nation's water resources has included development of a Storm Water Management Program (Lummi Water Resource Division [LWRD] 1998a, LWRD 2011b), a Wellhead Protection Program (LWRD 1997, LWRD 1998b, LWRD 2011c), a Wetland Management Program (LWRD 2000), a Non-Point Source Management Program (LWRD 2001, LWRD 2002), and Water Quality Standards for Surface Waters of the Lummi Indian Reservation (LWRD 2008). These programs are components of a comprehensive water resources management program (CWRMP) being developed and implemented pursuant to Lummi Indian Business Council (LIBC) resolutions No. 90-88 and No. 92-43.

In January 2004, the Lummi Nation Water Resources Protection Code (Title 17 of the Lummi Code of Laws [LCL]) was adopted. Based on a Reservation-wide wetland inventory completed in 1999 (Harper 1999) and as described in Chapter 17.06 (Stream and Wetland Management) of LCL Title 17, different types of wetlands that vary in their quality and importance occur on the Reservation. In order to establish appropriate levels of protection, pursuant to LCL Chapter 17.06 the Reservation wetlands must be classified into one of four categories. Lummi Administrative Regulation (LAR) 17 LAR 06 identifies methodologies to evaluate Reservation wetlands.

Category 1 wetlands are considered critical value wetlands that have a high and irreplaceable level of importance for fisheries, Lummi culture, and/or water quality on the Reservation. Category 2 wetlands are wetlands that do not meet the Category 1 criteria but are high value wetlands that perform important ecological or hydrologic functions. Category 3 wetlands provide a moderate level of functions and are often less diverse. Category 4 wetlands have minimum habitat value and are suitable for restoration or enhancement efforts.

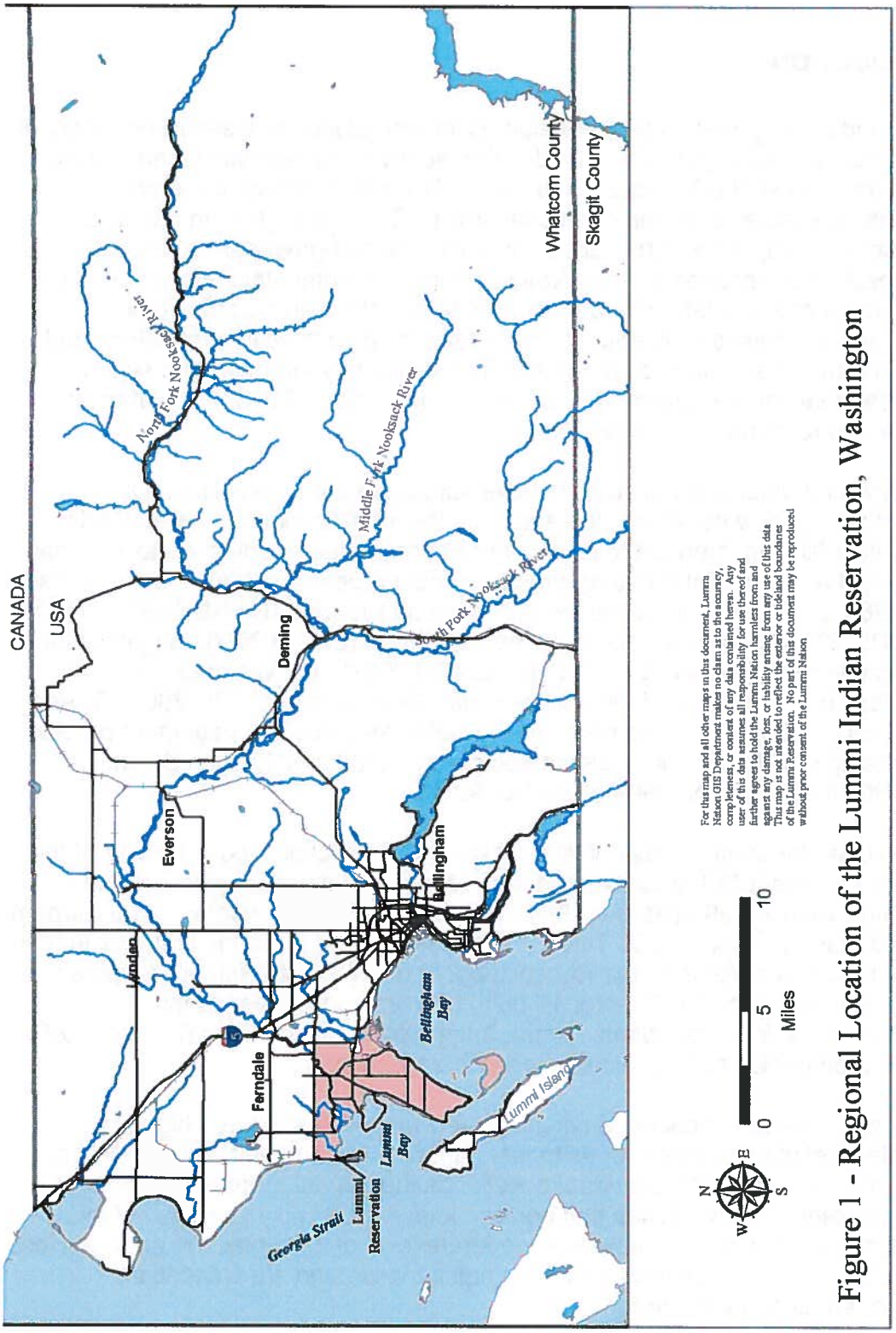


Figure 1 - Regional Location of the Lummi Indian Reservation, Washington

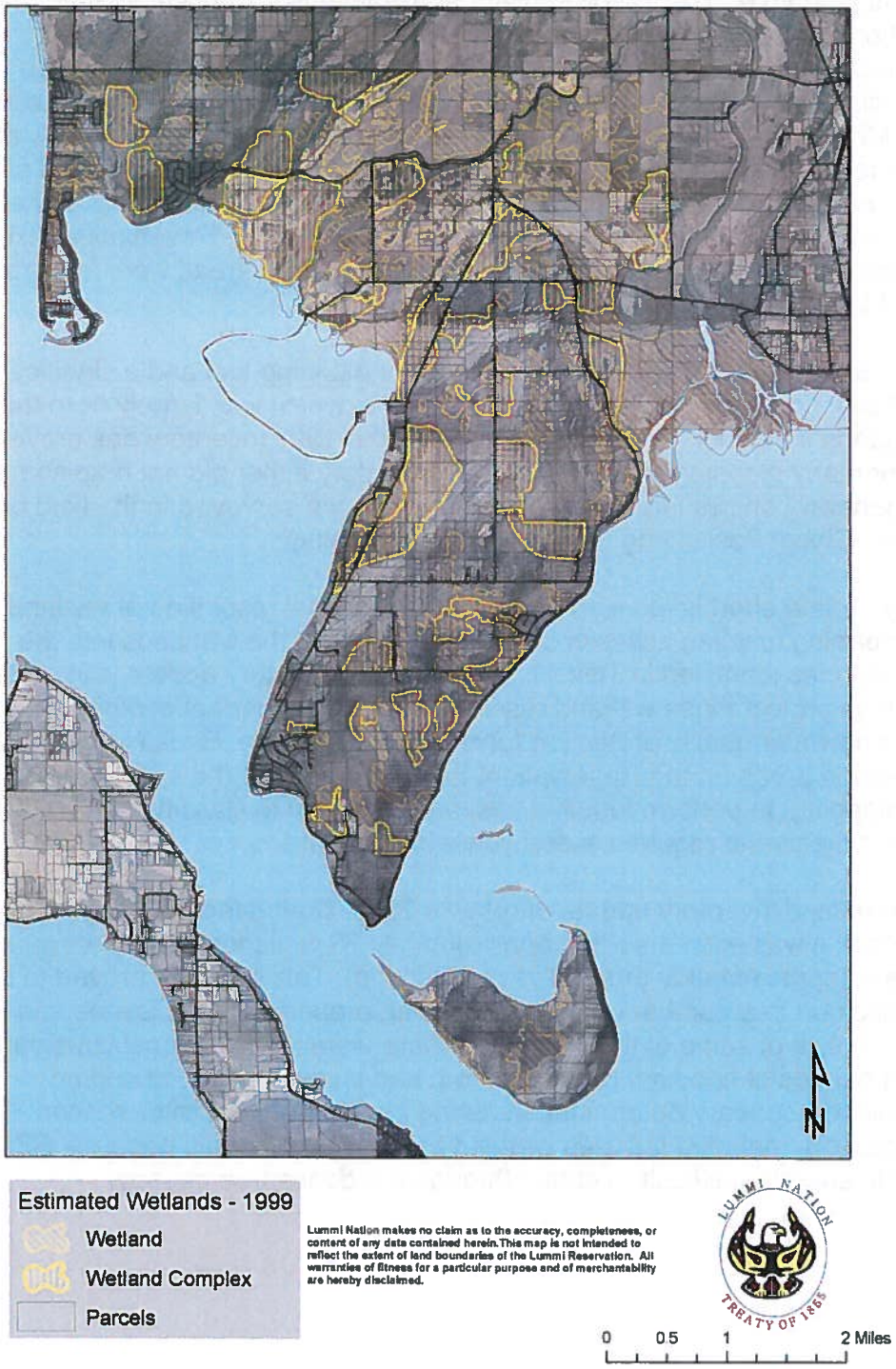
The purpose of the 1999 Reservation-wide wetland inventory was to identify wetland locations and to collect information on the characteristics and functions of the Reservation wetlands. The 1999 Reservation-wide wetland inventory (Harper 1999) relied largely on remotely sensed data (i.e., color and infra-red aerial photographs), generalized mapping (i.e., USDA soil survey), and limited field verification to identify wetland locations and sizes. In addition to identification and mapping, the 1999 inventory collected general wetland information including Cowardin classification (Cowardin et al. 1979), water source, and soil type. The Washington State Function Assessment Method (WFAM) was applied to 12 assessment units (AUs) in 9 selected wetlands on the Reservation. The 1999 inventory identified and mapped a total of 214 wetlands and wetland complexes on the Reservation (Figure 2). These wetland areas totaled 5,432 acres, or roughly 43 percent of the land area of the Reservation, excluding tidelands. Approximately 60 percent of these mapped wetland areas were located in the flood plains of the Lummi and Nooksack rivers.

Although the 1999 inventory represents an important planning tool and a significant improvement over the previously available information, which was largely from the National Wetlands Inventory (NWI) (USFWS 1987), the 1999 inventory has proven to be too general for many planning efforts. The 1999 inventory either did not map some wetlands or generally shows larger wetland areas than are surveyed in the field or identified using Global Positioning System (GPS) technology.

The inventory update effort is focused on refining the spatial resolution of wetland mapping, performing function assessments, and classifying the wetlands into the regulatory categories identified in Title 17. The wetland inventory update is intended to support efforts to protect these wetland resources and the important ecological, hydrological, and water quality protection functions they provide. Because of the large number of wetland areas on the Reservation, the effort to refine the spatial resolution of the wetland mapping, to perform function assessments, and to classify the Reservation wetlands was projected to require several years to complete.

Year 1 of the wetland inventory update effort was 2005. During the planning stages for this update effort, it was estimated that approximately 70 wetlands could be evaluated during one year (approximately three days per wetland). This estimate proved to be overly optimistic due to a number of factors including property access issues and the remoteness and size of some of the wetlands. There were also seasonal considerations including long periods of flooding, frozen ground, and snow that limited and/or prevented wetland boundary determination during portions of the winter season. During the summer season, mapping forested wetland areas is problematic because GPS satellite signals are often difficult to obtain through the dense tree canopy.

Figure 2 - 1999 Wetland Inventory Results



As described in more detail below, a wetland-consulting firm was contracted following Year 3 of the update effort to provide an independent program evaluation and quality assurance/quality control review. As a result of this evaluation and review, the functional assessment element of the wetland inventory update effort was deemphasized during Year 4. The consultant recommended functional assessments be deferred for wetlands until a development activity is imminent and the assessment is needed to determine appropriate mitigation measures for any unavoidable wetland impacts.

As a result of the independent program evaluation and review, starting in Year 4 (2008) the inventory update consists of conducting a site visit(s), performing a detailed reconnaissance-level delineation, using a mapping grade GPS unit to map the approximate location of the identified wetland boundaries, collecting representative data samples in wetland and upland locations, and classifying the wetlands into one of the four Lummi wetland categories.

This report summarizes the results of Year 9 of this inventory update effort. The results from Year 1 through Year 8 of the update effort are summarized in similar synthesis reports (LWRD 2005, LWRD 2006, LWRD 2007, LWRD 2009, LWRD 2010, LWRD 2011, LWRD 2012, and LWRD 2013). In total, 15 wetlands are identified as part of this Year 9 effort. When combined with the 241 wetlands identified during Year 1 through Year 8 of the inventory update, a total of 256 wetlands have been evaluated as part of the inventory update effort. This total is more than the 214 wetlands identified on the Reservation during the 1999 inventory. As described in more detail below, the increase in the number of wetlands is due to the more detailed fieldwork which resulted in the identification of additional wetlands and splitting of previous wetland polygons into more accurate smaller polygons. To date, the area covered in the inventory update is slightly less than 50 percent of the Reservation land (not including tidelands).

2.0 METHODS FOR WETLAND INVENTORY UPDATE

The methods used to update and refine the spatial resolution of the 1999 inventory are described below. Lummi Water Resources Division staff and consulting firms hired by the Lummi Planning Department, the Lummi Housing Authority, the Lummi Tribal Sewer and Water District, or the Lummi Natural Resources Department collected and interpreted the field data summarized in this Year 9 wetland inventory update report.

Three interrelated methods were used to update and refine the 1999 inventory. The different methods were used for wetland mapping/boundary determination, wetland rating/classification, and updating the Lummi Nation GIS wetland inventory/database.

2.1 Method for Wetland Mapping/Boundary Determination

Properties evaluated during the current inventory year were chosen based on development applications and/or potential for development. Because of property access issues and the remoteness and size of some of the Reservation wetlands, it is not practical to undertake a geography-based approach (i.e., watershed by watershed).

Instead, the parcels evaluated during this inventory update were based on areas with a high probability of development, areas being considered for purchase, areas where field conditions were appropriate for obtaining an accurate wetland boundary for the season, parcels for which Lummi Land Use Permit Applications were submitted to the Lummi Planning Department, and/or parcels where a development project has recently or is currently occurring.

In several cases, the inventory update was completed only within the confines of a single parcel or portion of a parcel. Many of these parcels were identified in the 1999 inventory as containing large wetlands or wetland complexes located over multiple contiguous parcels. Because acquiring landowner permission is time consuming, particularly for undivided parcels in trust status that may have in excess of 100 landowners, in many cases only a portion of the wetland was mapped. As a result, there are several wetlands and numerous fragments of wetlands that have been mapped by Lummi Water Resources Division staff during the last several years. Whenever possible, staff attempted to identify the wetland boundary to the limits of the parcel boundaries. These partial wetland areas are mapped and appear in Figure 3 and Figure 4. Completion of the updated wetland boundaries and classification/ratings has not yet been performed due to time constraints, adverse weather, and/or other reasons. These areas have been archived in the Lummi Nation Geographic Information System (GIS) so that work can continue on these wetlands and mapping, function assessments, and categorization can be finalized in the future as this wetland inventory update is completed.

Once a wetland from the 1999 inventory or a land parcel was selected for evaluation, the methodology used to reliably identify and map the wetland boundaries was as follows:

1. Prior to conducting a field visit, available remotely sensed data including high resolution aerial photography collected during 2004, 2008, and 2010 (approximately 0.5 feet resolution) and high-resolution (approximately ±0.5 feet accuracy) topographic information acquired in 2005 using Light Detection and Ranging (LiDAR) technology were reviewed. Maps developed as part of the USDA soil survey for the area (USDA 1992) were also reviewed.

2. Information developed during the 1999 wetland inventory (if available), including watershed name and size, wetland size, Cowardin classes present, and USDA soil units in the vicinity were reviewed.

3. During the field visit(s), one of the following two methods for determining wetland boundaries was used:

   • Delineation Level Method. If development activities were planned that would potentially impact wetlands, or a jurisdictional determination of the wetland boundary was required, the wetland boundary was delineated in the field using the criteria and methodology from the *Corps of Engineers Wetland*

Delineation Manual (Environmental Laboratory, 1987) and in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (COE 2010). The manuals require examination of three parameters: vegetation, soils, and hydrology. This methodology requires evidence of at least one positive wetland indicator for each of the three parameters (vegetation, soils, and hydrology) to make a positive wetland determination. The specified criteria are mandatory and must all be present under normal environmental conditions. This method was used for wetlands that were adjacent to and associated with a development permit. These wetlands were typically delineated and surveyed by a professional surveyor, and computer aided design (CAD) data were provided to be incorporated into the Lummi GIS Database.

- Reconnaissance Level Method. If development activities were not planned, a "reconnaissance-level" investigation was conducted to identify the approximate wetland boundary. Although the reconnaissance level investigation was conducted with reasonable accuracy, it is less exact than a boundary identification made during a more detailed "delineation" of the precise boundary. Much more time would be required if a formal delineation and jurisdictional determination were made on all the wetlands due to additional data that would need to be acquired. For the reconnaissance level determinations, the same criteria was applied but in a less formal and detailed manner. The wetland boundaries were identified within approximately ± 10 feet and were recorded using a handheld Trimble GeoXT GPS unit, and downloaded into the ArcMap10.1 GIS software program. The horizontal accuracy of the Trimble GeoXT GPS unit is ± 2 feet once the collected data are post-processed. In some cases, only a portion of the wetland edge was recorded using a GPS unit, and the rest of the wetland boundary estimated using a combination of other methods (e.g., aerial photography and LiDAR). In other cases, portions of the wetland boundaries were recorded using a combination of an on-the-ground reconnaissance, GPS data, soil mapping, LiDAR data, and recent aerial photography.

2.2 Method for Wetland Rating/Classification

Pursuant to the Lummi Water Resources Protection Code (LCL Title 17) and 17 LAR 06.030, the Washington State Department of Ecology's *Wetland Rating System for Western Washington – Revised* (Hruby, 2004) was used to classify all wetlands inventoried for this Year 9 effort.

The wetland classification system was designed to differentiate between wetlands based on their sensitivity to disturbance, their significance, their rarity, the ability to replace them, and the functions they provide. The classification system results in rating wetlands into one of the following four categories:

- Category 1 wetlands are those that represent a unique or rare wetland type, or are more sensitive to disturbance than most wetlands, or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime, or provide a high level of functions (scores > 70 points).
- Category 2 wetlands are difficult, though not impossible to replace, and provide high levels of some functions (scores between 51 – 69 points). These wetlands occur more commonly than Category 1 wetlands, but still need a relatively high level of protection.
- Category 3 wetlands provide a moderate level of functions (scores between 30 – 50 points). They have been disturbed in some ways, and are often less diverse or more isolated from other natural resources in the landscape than Category 2 wetlands.
- Category 4 wetlands have the lowest levels of functions (scores less than 30 points) and are often heavily disturbed. These are wetlands are most likely to be successfully replaced, and in most cases, improved. These wetlands may provide some important ecological functions, and also need to be protected.

The categories are intended to be the basis for wetland protection and management to reduce further loss of their value as a resource. Some decisions that can be made based on the rating include the width of buffers needed to protect the wetland from adjacent development, the mitigation ratios needed to compensate for impacts to the wetland, and permitted uses in the wetland. The wetland categorization or rating is the basis for determining the size of wetland buffers on the Reservation (LCL Title 17).

As a component of the rating process, a classification key was used to determine whether the wetland was riverine, depressional, slope, lake-fringe, tidal fringe, or tidal flats according to the hydrogeomorphic (HGM) classification system.

2.3 Method for Updating the Lummi Nation GIS Wetland Inventory/Database

As described in Section 2.1, the updated wetland boundaries were recorded by either a land survey or by using a mapping-grade Trimble GeoXT GPS unit. All information was entered into ArcMap10.1 GIS software. Once entered into the GIS, any newly identified wetland areas were assigned an identification number corresponding to the update year. A new numbering system, started in Year 7, replaced the old numbering system that was started in 1999 and was based on the Public Land Survey System (Township, Range, and Section). The current numbering system is intended to avoid numbering problems inherent in the old system related to splitting, lumping, and adjusting boundaries previously identified in 1999. Other data that were entered into the GIS database for new wetlands included wetland area in acres and hectares, comments about location or other unique features of the wetland, wetland rating/classification, HGM classification, Cowardin classification, the date the wetland was mapped, and watershed name.

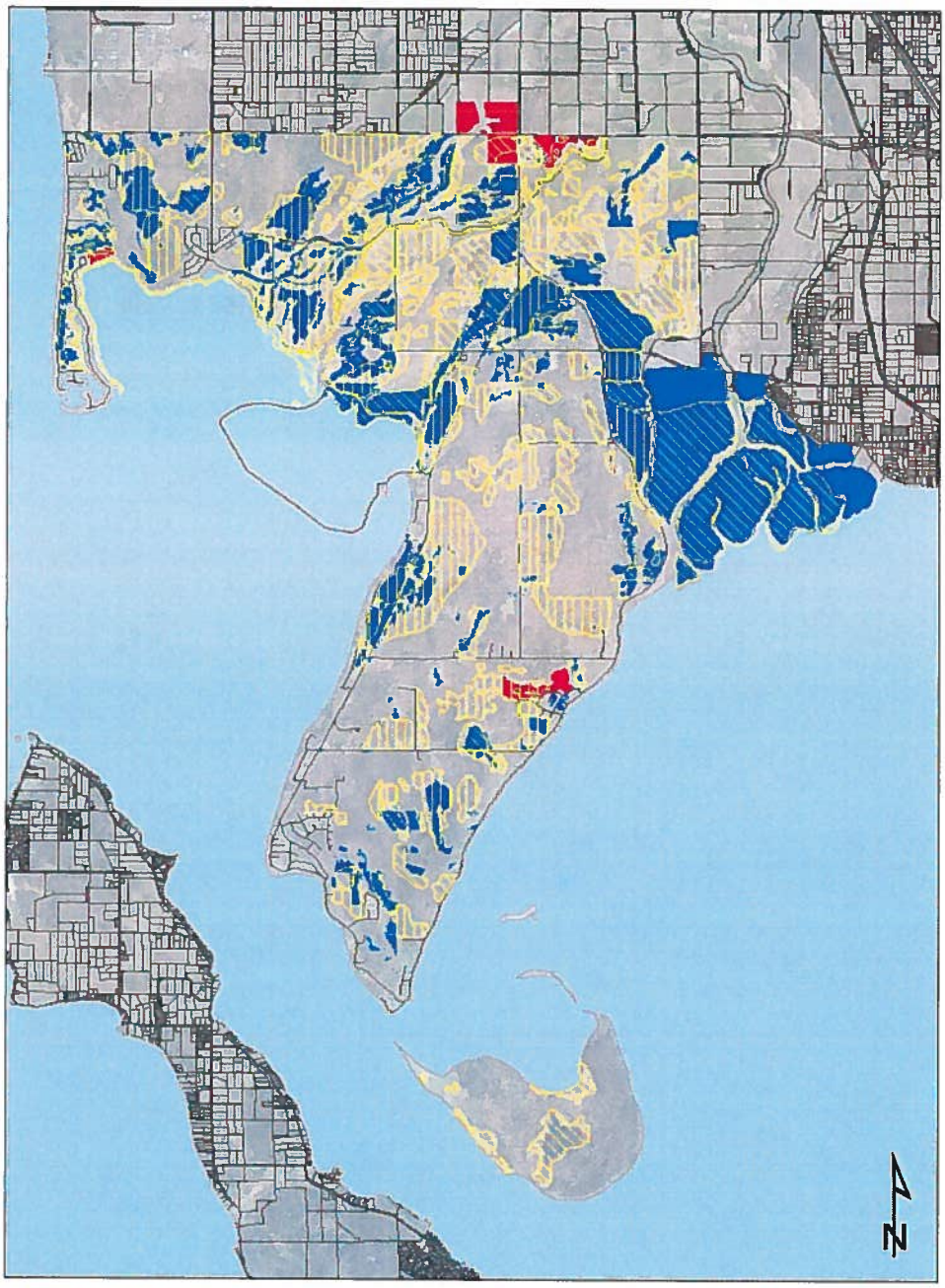
3.0 WETLAND INVENTORY UPDATE RESULTS

The Year 9 results are summarized below. Hard copies and electronic copies of the detailed field forms for the wetland areas are maintained on file at the Lummi Water Resources Division office. An example of the documentation is included as Appendix C.

3.1 Results of Wetland Mapping and Boundary Determination During 2013

A total of 15 wetland areas were reviewed on the Lummi Reservation in the Year 9 wetland inventory update effort (Figure 3). Detailed maps of each of these wetland areas are presented in Appendix A.

Figure 3 - Updated Wetland Boundaries and Estimated Wetland Locations



Lummi Nation makes no claim as to the accuracy, completeness, or content of any data contained herein. This map is not intended to reflect the extent of land boundaries of the Lummi Reservation. All warranties of fitness for a particular purpose and of merchantability are hereby disclaimed.

As summarized in Table 1, a total of approximately 183 acres of wetlands were mapped as part of the Year 9 update. A comparison of the wetland acreage mapped during the first nine years of this update effort is summarized in Table 1.

Table 1. Comparison of Wetland Areas Evaluated by Program Year

Year	Number of Wetlands Evaluated	Wetland Area (acres)
1 (2005)	36	1,413
2 (2006)	41	581
3 (2007)	20	380
4 (2008)	14	20
5 (2009)	48	127
6 (2010)	8	203
7 (2011)	50	269
8 (2012)	24	224
9 (2013)	15	183
Total	**256**	**3,400**

The annual variations in the reported acreage of mapped wetlands are due to a number of factors including:

- The Year 1 Report summarized work that occurred over a period of almost 3 years.
- The Year 2 Report summarized work that occurred over a 1-year period.
- The Year 3 Report summarized work that occurred over a 9-month period with a reduced work week as the Water Resources Planner II worked only 32 hours a week starting in June 2006.
- The Year 4 Report summarizes work that occurred over an 11-month period that included a Quality Assurance/Quality Control effort with ESA Adolfson, a re-verification of some wetland boundaries by Douglass Consulting, and the reorganization of the Lummi Natural Resources Water Resources Division. This reorganization eliminated the Water Resources Planner II position and created a Water Resources Planner I position. The staff transition included an investment in formal training and practical/field applications with various wetland scientists, which reduced the amount of time available to advance the wetland inventory update effort.
- The Year 5 Report summarizes work that occurred over a 1-year period including work completed in conjunction with wetland contractors hired by the Lummi Planning Department, Lummi Housing Authority, or the Lummi Tribal Sewer and Water District.
- The Year 6 Report summarizes work that occurred over a 1-year period including work completed in conjunction with wetland contractors hired by the Lummi Planning Department, Lummi Housing Authority, or the Lummi Tribal Sewer and Water District. Although fewer wetlands were evaluated during Year 6 compared

to previous years, the acreage/area of the evaluated wetlands was greater than the wetland area evaluated during Year 4 and Year 5 combined.

- The Year 7 Report includes work that occurred over a period of several years. Thirty of the wetlands were updated in prior years but had not yet been formally incorporated into the inventory update. Twenty of the wetlands were original work done by a combination of LIBC staff and wetland consultants hired by the Lummi Planning Department, Lummi Housing Authority, and/or Lummi Natural Resources Department.
- The Year 8 and 9 Reports each summarize work that occurred over a 1-year period including work completed in conjunction with wetland consultants hired by the Lummi Planning Department, Lummi Housing Authority, and/or Lummi Natural Resources Department.

Table 2 lists the 15 wetlands identified in the Year 9 wetland inventory update effort and their acreage. The identified wetlands are shown in Figure 3 and in higher resolution mapping included in Appendix A.

In the past, Table 2 also compared the wetland update acreage to the 1999 wetland inventory acreage. Over the past few years, it became evident that this comparison was not particularly valid in many cases. The majority of the wetlands identified in the current update effort were either not identified in the 1999 inventory, or the wetland location or extent was not similar enough to the 1999 polygon to compare. Because of this lack of alignment and the resulting reduced utility of comparing the current effort to the 1999 inventory results, the comparison is not included in this report and will not be included in future update reports.

One additional change during Year 9 was that a number of wetland areas identified in the 1999 inventory were reviewed and it was determined that they were not wetland areas. These areas were removed from the GIS wetland layer as part of this update. Also, a few wetlands previously updated in Years 1 to 8 were re-visited and the extent has changed. In these cases, the old updated polygon was deleted and a new wetland polygon was created. These deletions to the overall wetland inventory are included in Table 3. Figures of the affected wetlands are shown in Appendix B.

Table 2 –Wetland Area Reviewed During the Year 9 Inventory Update

Wetland ID Number	Watershed Identification	Inventory Update Wetland Size (Acres)
2013-01	G	40.52
2013-02	G	0.18
2013-03	O	35.95
2013-04	O	38.51
2013-05	O	24.08
2013-06	O	0.87
2013-07	L	24.85
2013-08	L	0.43
2013-09	L	5.13
2013-10	O	0.07
2013-11	O	1.36
2013-12	S	0.19
2013-13	S	0.5
2013-14	R	10.51
2013-15	O	0.24
	Total	**183.39**

Table 3 –Wetland Area Removed from the Inventory During the Year 9 Update

Wetland ID Number	Watershed Identification	Inventory Update Wetland Size Removed (Acres)
38N01E01-06A	O	25.50
38N01E01-18	L	3.88
38N01E01-23	L	1.11
38N01E04-08	Q	7.50
38N01E024-02	G	10.46
38N01E25-01	G	28.81
38N01E25-10	G	1.86
38N01E25-11	G	2.63
38N01E06-01	L	2.01
38N01E06-02	L	0.54
38N01E01-01	O	0.39
38N01E01-11	K	0.11
	Total	**84.80**

3.2 Results of Wetland Classification

Pursuant to 17 LAR 06.030, the *Washington State Wetland Rating System for Western Washington* (Hruby 2004) was applied to the 15 wetland areas evaluated in 2013. Table 4 presents a summary of the wetland rating and classification for wetlands evaluated.

Table 4 – Wetland Rating and HGM Classification

Wetland ID Number	Watershed Identification	Wetland Rating	HGM Class
2013-01	G	II	Depressional
2013-02	G	III	Depressional
2013-03	O	III	Depressional
2013-04	O	III	Depressional
2013-05	O	IV	Depressional
2013-06	O	IV	Depressional
2013-07	L	III	Depressional/ Slope
2013-08	L	III	Slope
2013-09	L	III	Depressional/ Slope
2013-10	O	III	Depressional
2013-11	O	III	Depressional
2013-12	S	III	Depressional
2013-13	S	III	Depressional
2013-14	R	II	Depressional/ Riverine
2013-15	O	IV	Depressional

Of the wetlands evaluated during Year 9, no wetlands were rated as Category 1, two wetlands were rated as Category 2, 10 were rated as Category 3 wetlands, and three wetlands were rated as Category 4.

4.0 SUMMARY

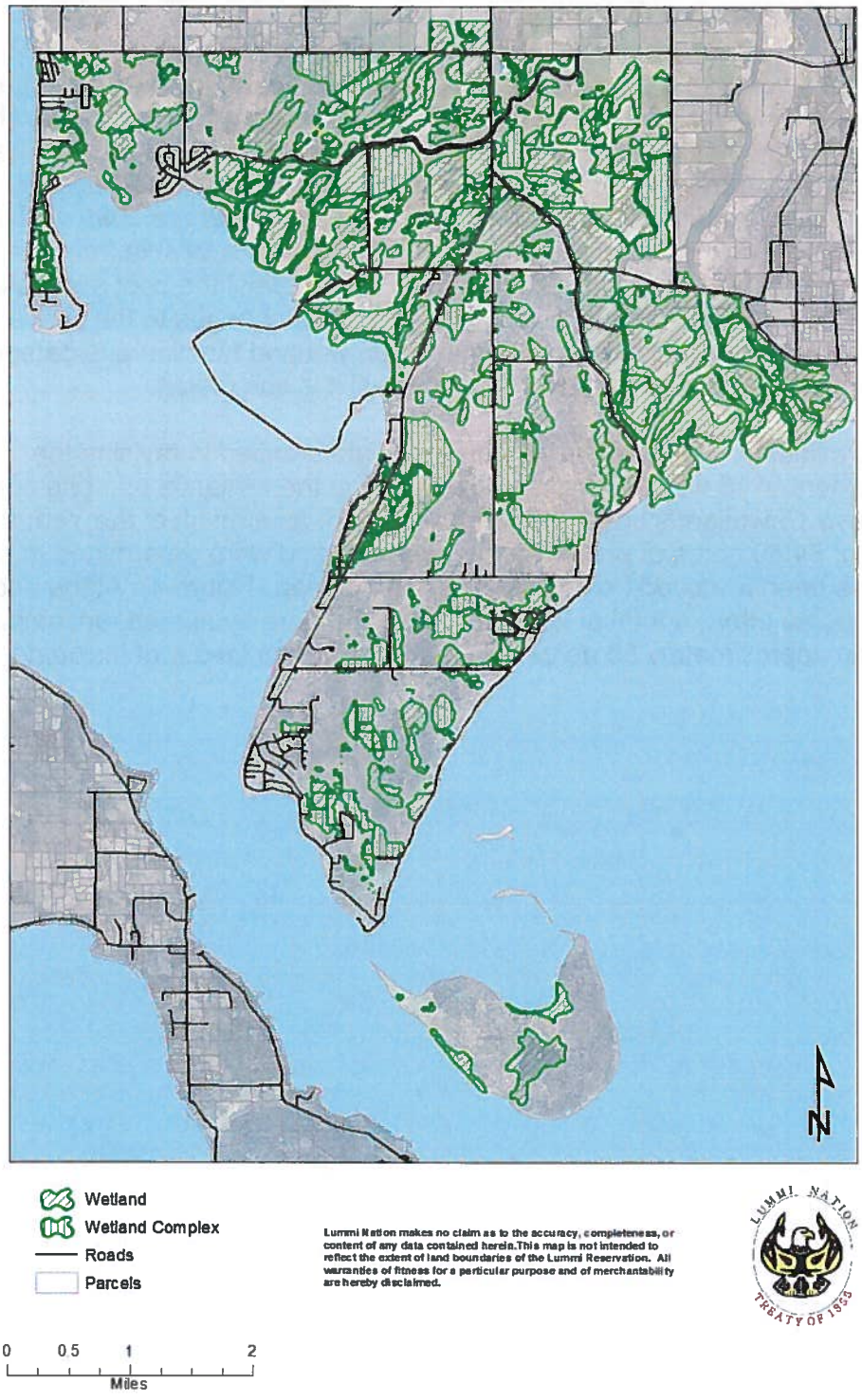
Accurate information on wetland locations, extent, wetland category, and wetland functions is needed to effectively manage Reservation wetlands pursuant to the Lummi Nation Water Resources Protection Code (LCL Title 17) and associated Lummi Administrative Regulations. Although the 1999 inventory represents an important planning tool and a significant improvement over the previously available information, it has proven to be too general for many planning efforts. Refining the spatial resolution of the wetland mapping and classifying the wetlands into the regulatory categories identified in Title 17 is intended to support efforts to protect these wetland resources and the important ecological, hydrological, and water quality protection functions that they provide. Because of the large number of wetland areas on the Reservation, the effort to refine the spatial resolution of the wetland mapping and to classify the Reservation wetlands is projected to require several years to complete. This report summarizes the results of Year 9 of this inventory update effort.

The overall result of the inventory update effort will be a more accurate GIS data layer and an associated database that contains the Category and other summary information about each wetland on the Reservation. Information about the wetland category will allow for the associated buffer to be mapped.

Hard copies of field notes (e.g., wetland rating worksheets, data, location maps) and electronic copies are maintained in the Lummi Water Resources Division office. Until the update effort is completed, the GIS data layer and associated database will be a work in progress. The current version of the Lummi Reservation Wetland Map is shown in Figure 4. Figure 4 shows the information in Figure 3 except that the 1999 wetland locations were removed where more accurate information was available from the Year 1 through Year 9 inventory updates. Figure 4 is intended to reflect the best available information on Reservation wetlands to date. Based on the changes to the spatial locations and the utility of the collected information on wetland function and category, the inventory update is recommended to continue until it is completed.

As described previously, Year 9 of this inventory update resulted in revising the locations and extent of 15 wetland areas and classifying the wetlands into one of four categories. These 15 wetlands cover 183.39 acres. Also, as a result of the Year 9 update, a total of 84.80 acres of previously mapped wetland were determined to be upland and have been removed from the best available map (Figure 4). At the end of Year 9 of this update effort, a total of 256 wetland areas were evaluated, encompassing slightly less than approximately 50 percent of the Reservation land (not including tidelands).

Figure 4 - Best Available Wetland Inventory Map (December 2013)



5.0 REFERENCES

Brinson, M.M. 1993. *A Hydrogeomorphic Classification for Wetlands.* U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS. Wetlands Research Program Technical Report WRP-DE-4.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Government Printing Office, Washington, D. C. Publication No. FWS/OBS-79/31.

ESA Adolfson, 2008. Wetland Inventory Peer Review Findings and Recommendations. ESA Adolfson, Seattle WA. Prepared for Lummi Indian Business Council, LummiReservation, Bellingham WA.

Harper, K. 1999. Comprehensive Wetland Inventory of the Lummi Reservation. Sheldon and Associates, Inc. Seattle Washington.

Hruby, T, T. Granger, K. Brunner, S. Cooke, K. Dublanica, R. Gersib, L. Reinelt, K. Richter, D. Sheldon, E. Teachout, A. Wald, and F. Weinmann. 1999. Methods for Assessing Wetland Functions Volume 1: Riverine and Depressional Wetlands in the Lowlands of Western Washington. WA State Department of Ecology Publication #99-115. Olympia, Washington.

Hruby, T. 2004. Washington State Wetland Rating System for Western Washington – Revised. Washington State Department of Ecology Publication #04-06-025.

Lummi Water Resources Division (LWRD). 1997. Lummi Nation Wellhead Protection Program --Phase I. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. November.

Lummi Water Resources Division (LWRD). 1998a. Lummi Reservation Storm Water Management Program Technical Background Document. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. December.

Lummi Water Resources Division (LWRD). 1998b. Lummi Nation Wellhead Protection Program --Phase II. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington.

Lummi Water Resources Division (LWRD). 2000. Lummi Indian Reservation Wetland Management Program. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. March.

Lummi Water Resources Division (LWRD). 2001. Lummi Nation Non-Point Source Assessment Report. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. December.

Lummi Water Resources Division (LWRD). 2002. Lummi Nation Non-Point Source Management Program. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. January.

Lummi Water Resources Division (LWRD). 2005. Lummi Nation Wetland Inventory Update Year 1 Synthesis Report - 2005. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. December.

Lummi Water Resources Division (LWRD). 2006. Lummi Nation Wetland Inventory Update Year 2 Synthesis Report - 2006. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. December.

Lummi Water Resources Division (LWRD). 2007. Lummi Nation Wetland Inventory Update Year 3 Synthesis Report - 2007. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. November.

Lummi Water Resources Division (LWRD). 2008. Water Quality Standards for Surface Waters of the Lummi Indian Reservation. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. September.

Lummi Water Resources Division (LWRD). 2009. Lummi Nation Wetland Inventory Update Year 4 Synthesis Report - 2008. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. February.

Lummi Water Resources Division (LWRD). 2010. Lummi Nation Wetland Inventory Update Year 5 Synthesis Report - 2009. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. May.

Lummi Water Resources Division (LWRD). 2011a. Lummi Nation Wetland Inventory Update Year 6 Synthesis Report - 2010. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. March.

Lummi Water Resources Division (LWRD). 2011b. Lummi Nation Storm Water Management Program Technical Background Document 2011 Update Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. July.

Lummi Water Resources Division (LWRD). 2011c. Lummi Nation Wellhead Protection Program – 2011 Update. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. December.

Lummi Water Resources Division (LWRD). 2012. Lummi Nation Wetland Inventory Update Year 7 Synthesis Report - 2011. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. May 2012.

Lummi Water Resources Division (LWRD). 2013. Lummi Nation Wetland Inventory Update Year 8 Synthesis Report - 2012. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. January 2013.

Null, W.S., G. Skinner, and W. Leonard. 2000. Wetland functions characterization tool for linear projects. Washington State Department of Transportation, Environmental Affairs Office. Olympia.

U.S. Army Corps of Engineers (COE). 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

U.S. Army Corps of Engineers (COE). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-13. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Department of Agriculture-Soil Conservation Service (USDA). 1992. Soil Survey of Whatcom County Area, Washington.

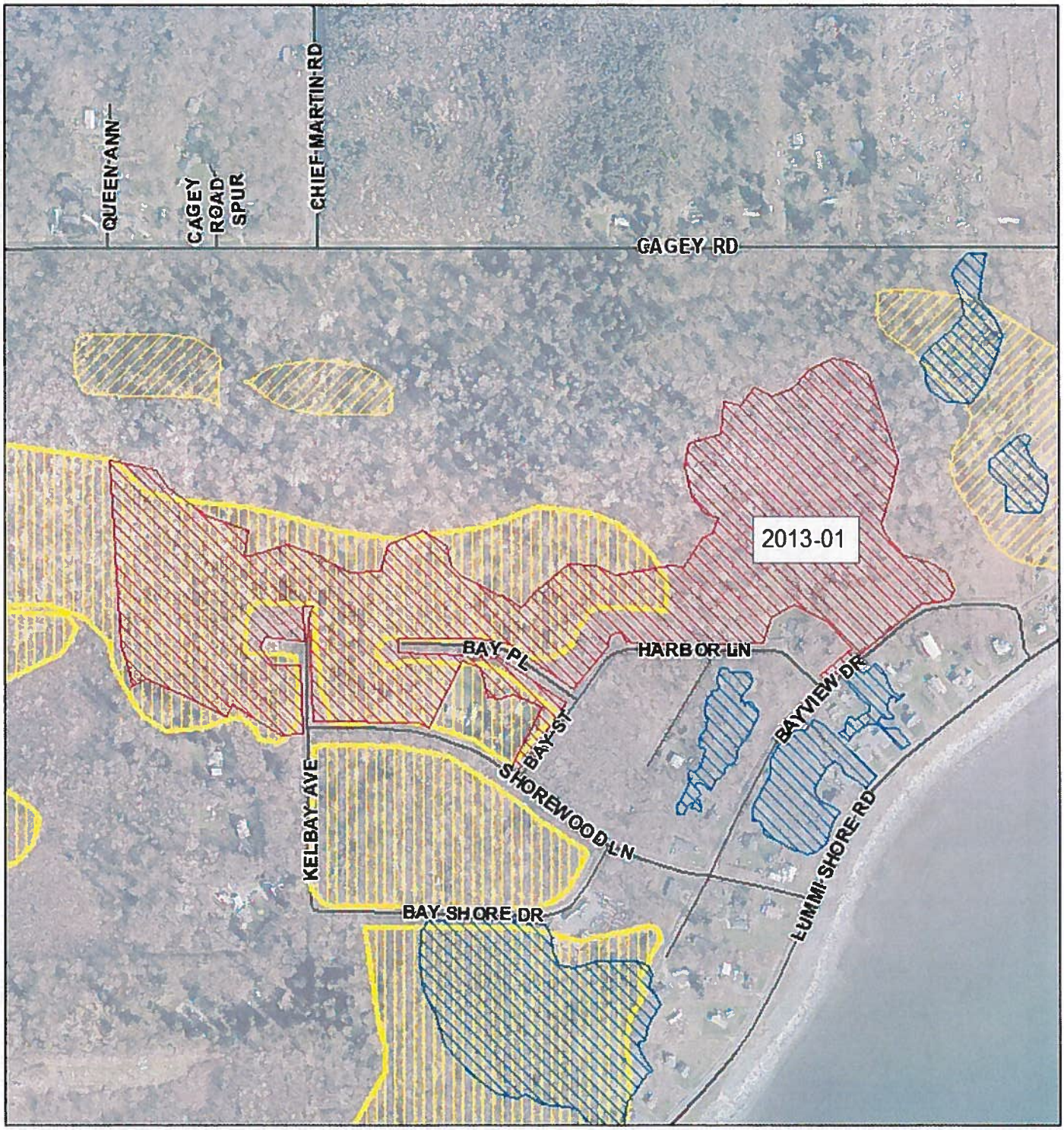
U.S. Fish and Wildlife Service (USFWS). 1987. National Wetlands Inventory. Washington, D.C.

This page intentionally left blank.

APPENDIX A – INDIVIDUAL WETLAND MAPS

This page intentionally left blank.

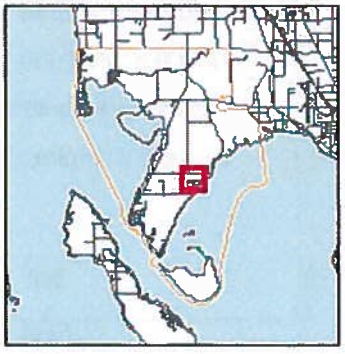
2013-01



Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)

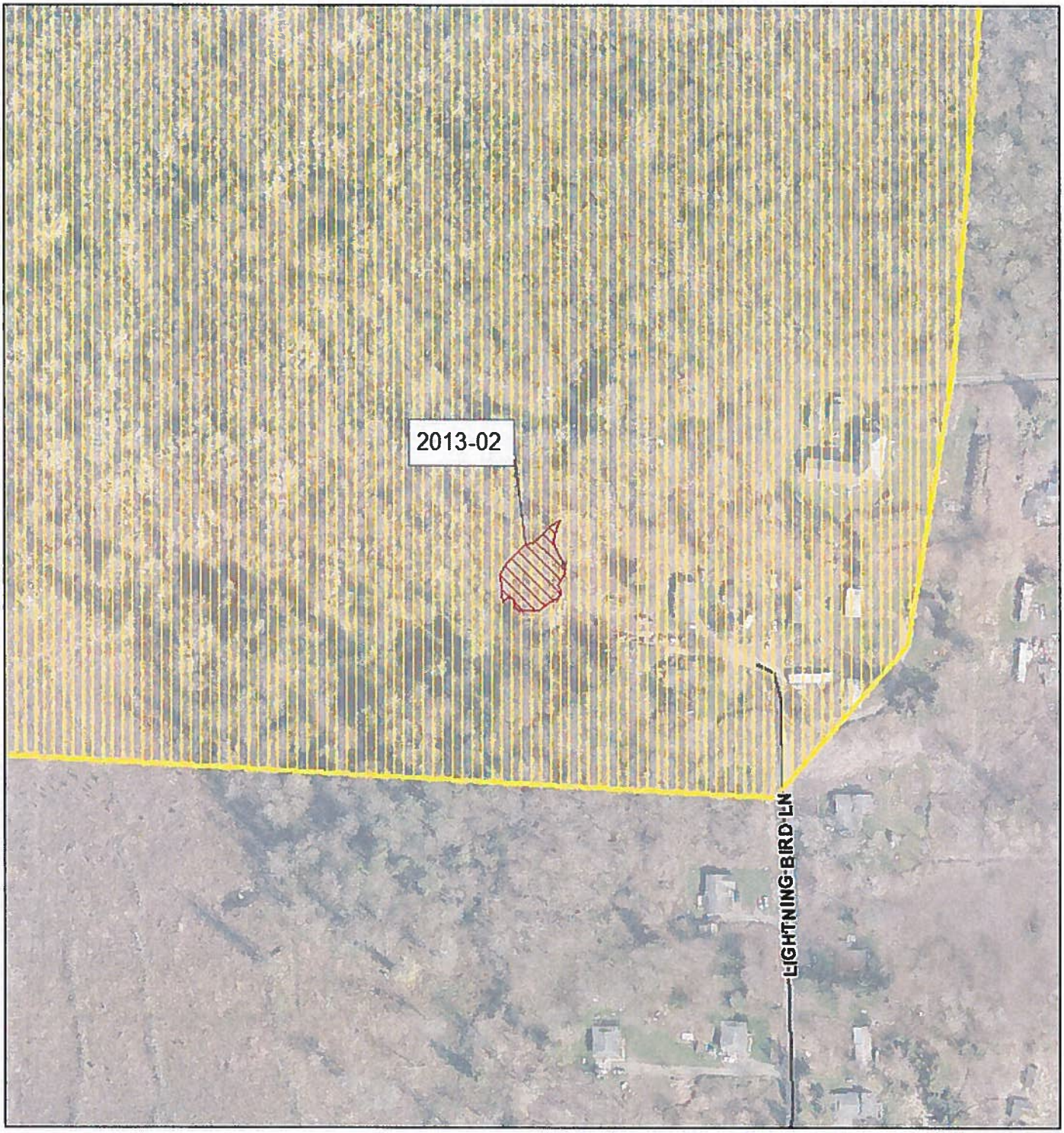
Roads
Lummi Reservation

N



0 300 600
Feet

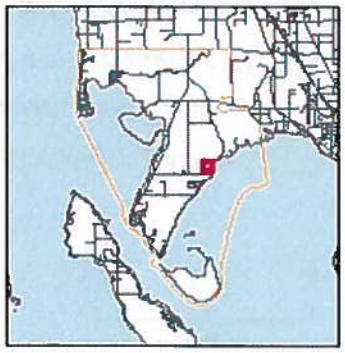
2013-02



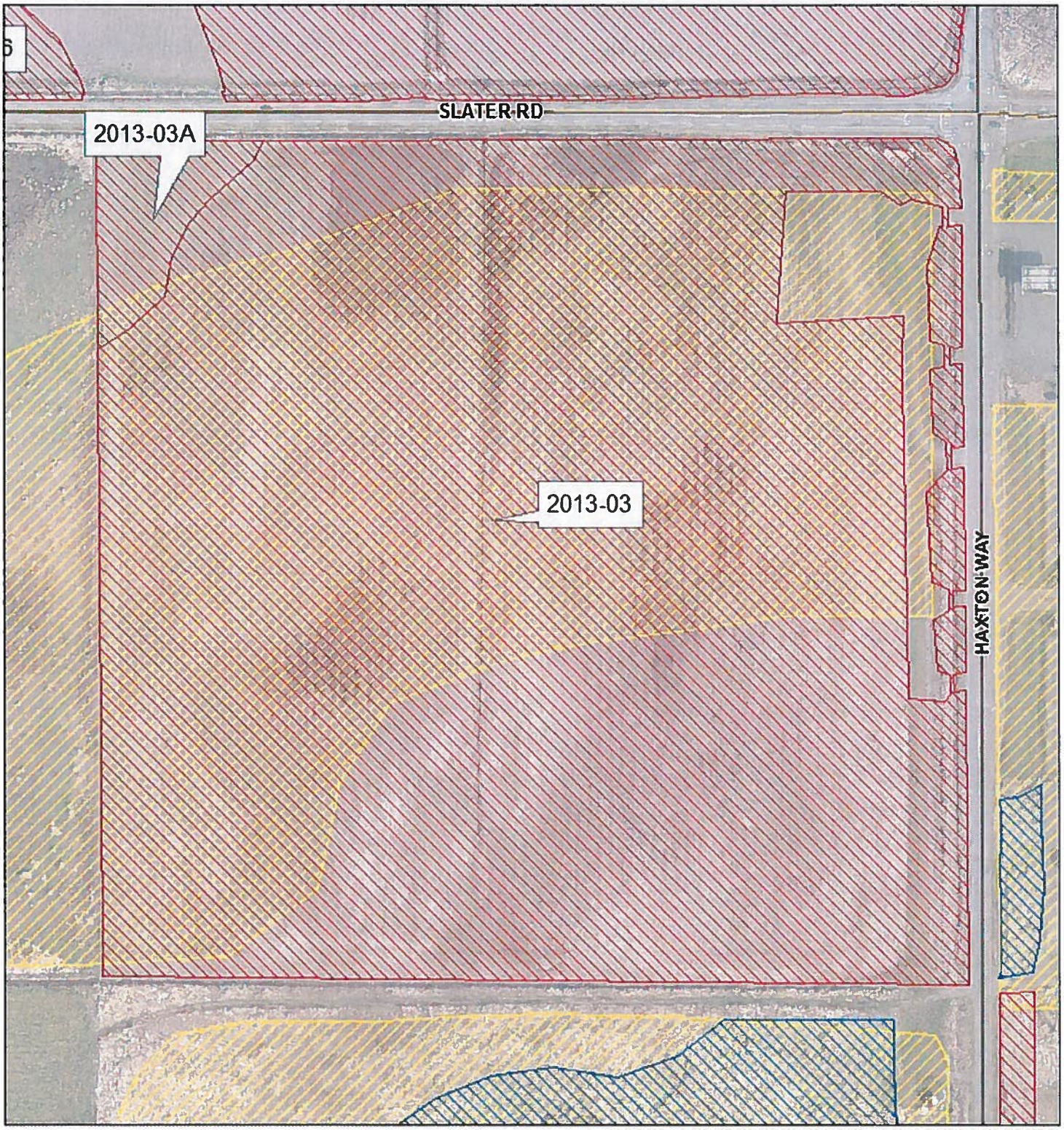
Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

N

0 300 600
Feet



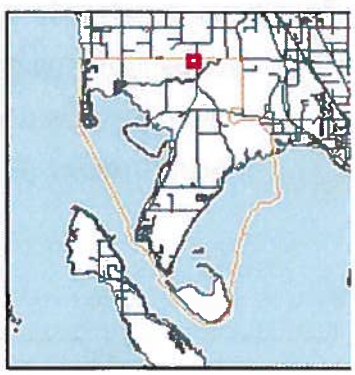
2013-03, 2013-03A



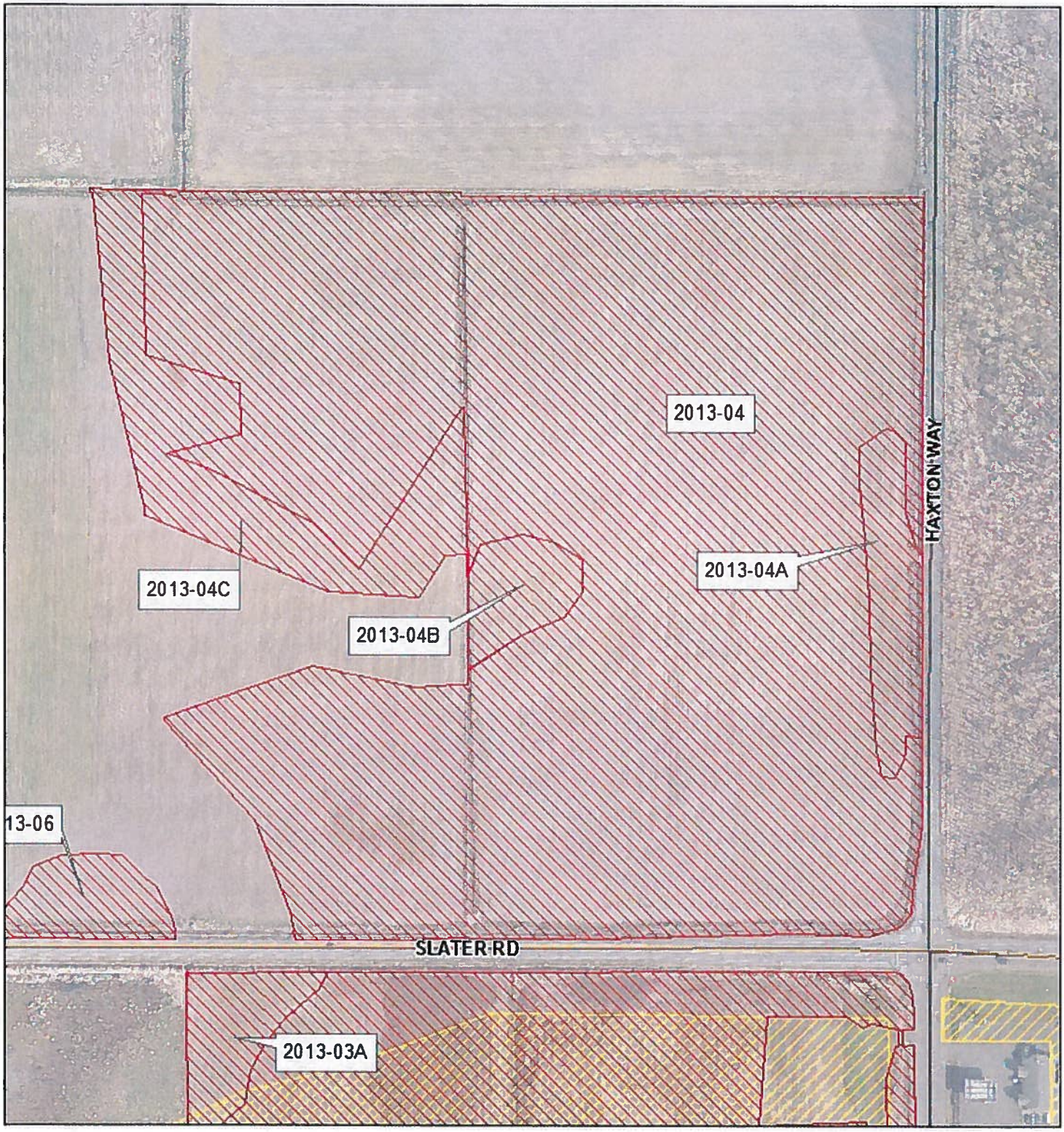
Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

N

0 300 600
Feet



2013-04, 2013-04A, 2013-04b, & 2013-04c



Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

N

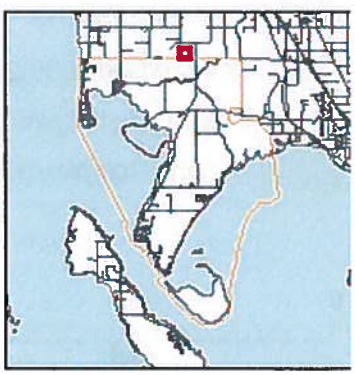
0 300 600
Feet

2013-05 & 2013-06

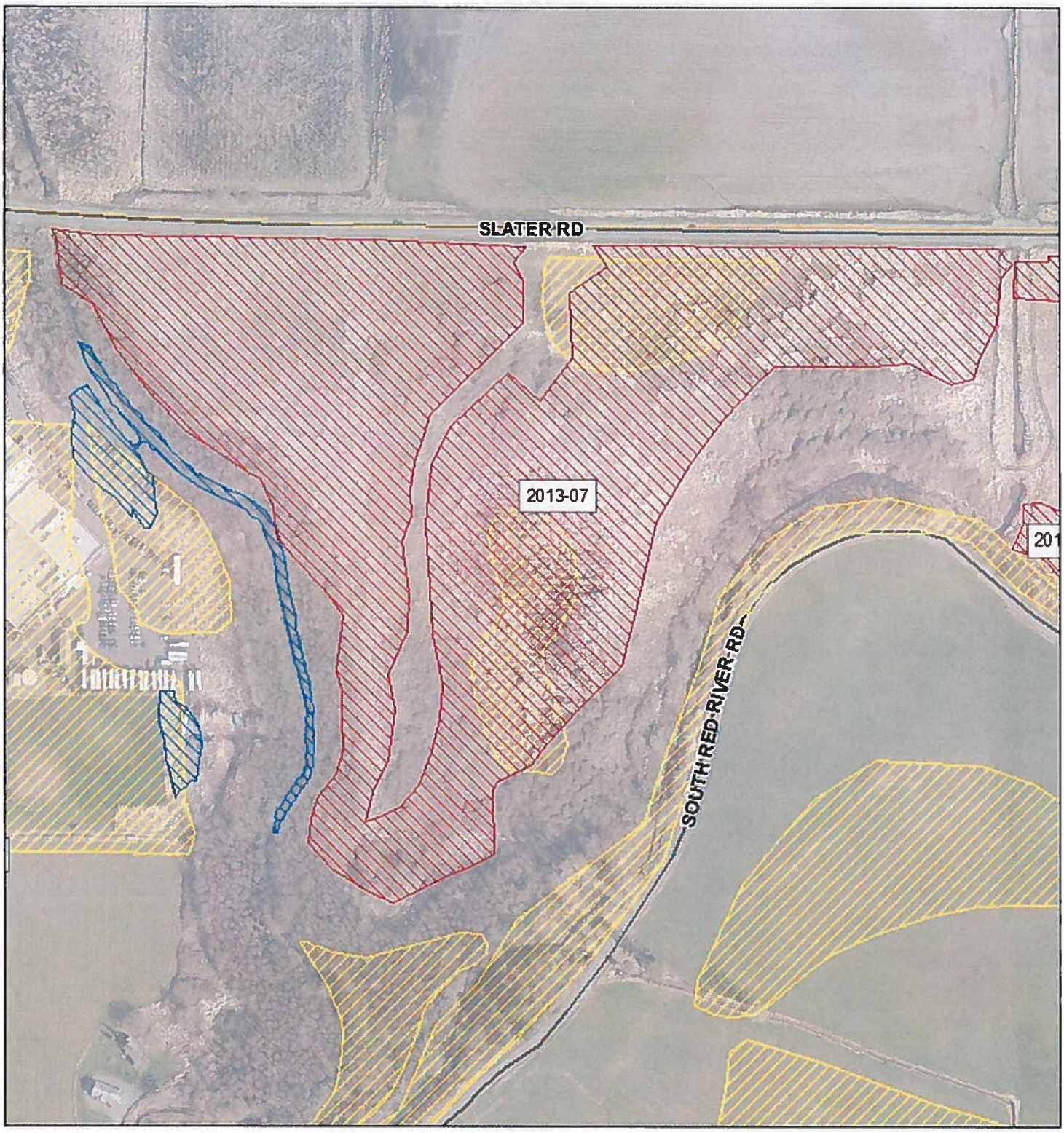
Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

N

0 300 600
Feet



2013-07

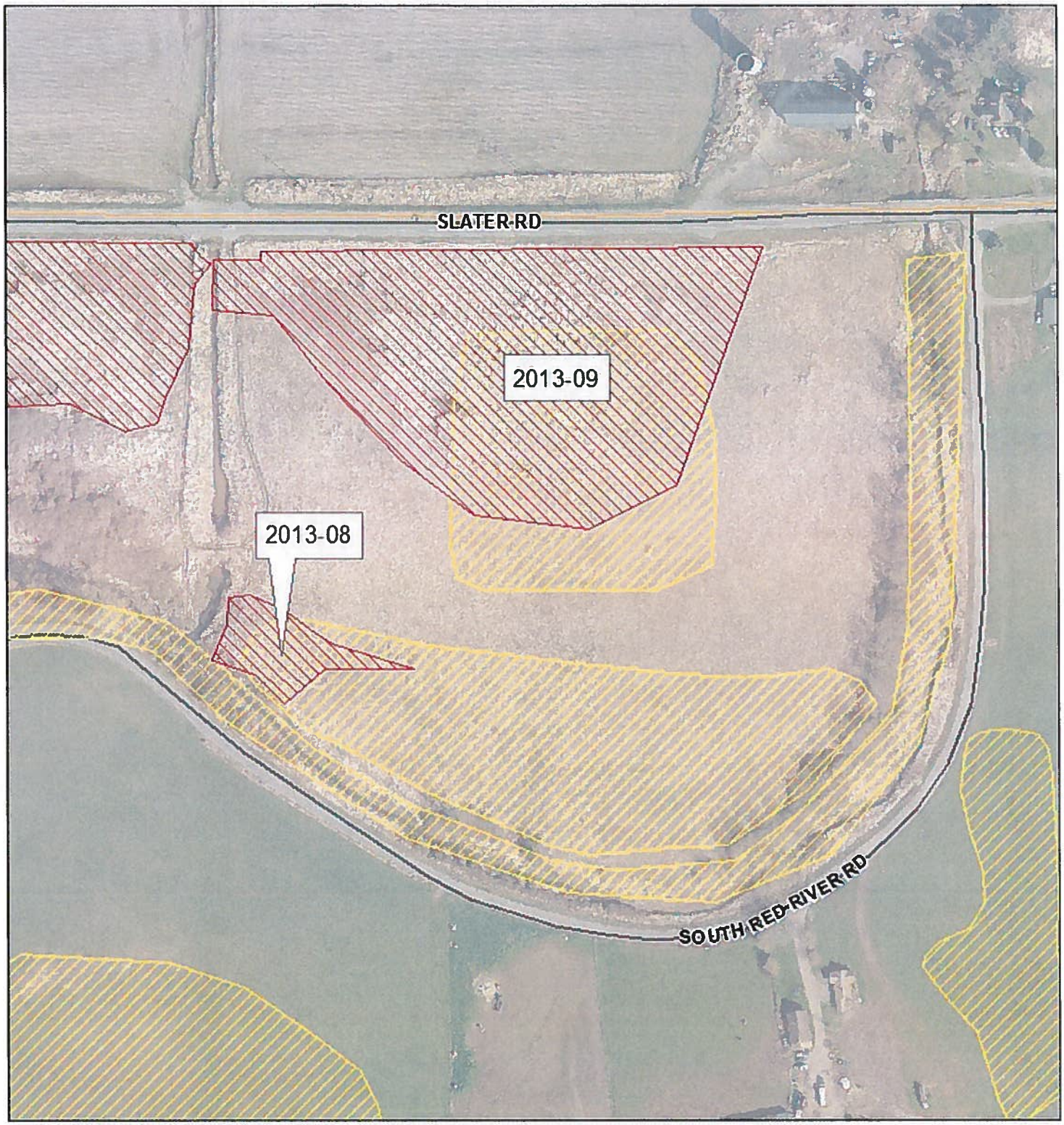


Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

N

0 300 600
Feet

2013-08 & 2013-09

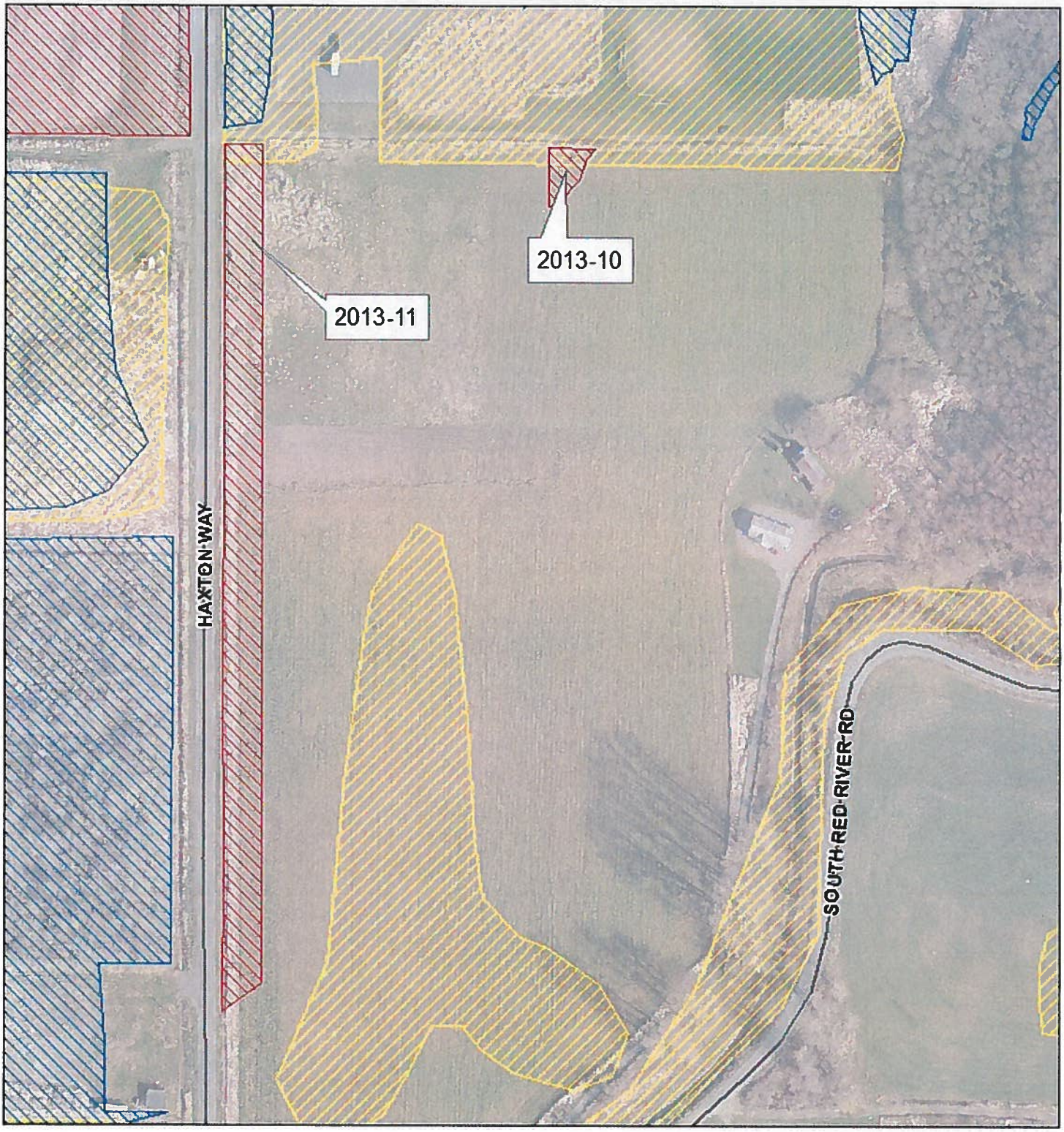


Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

N

0 300 600
Feet

2013-10 & 2013-11

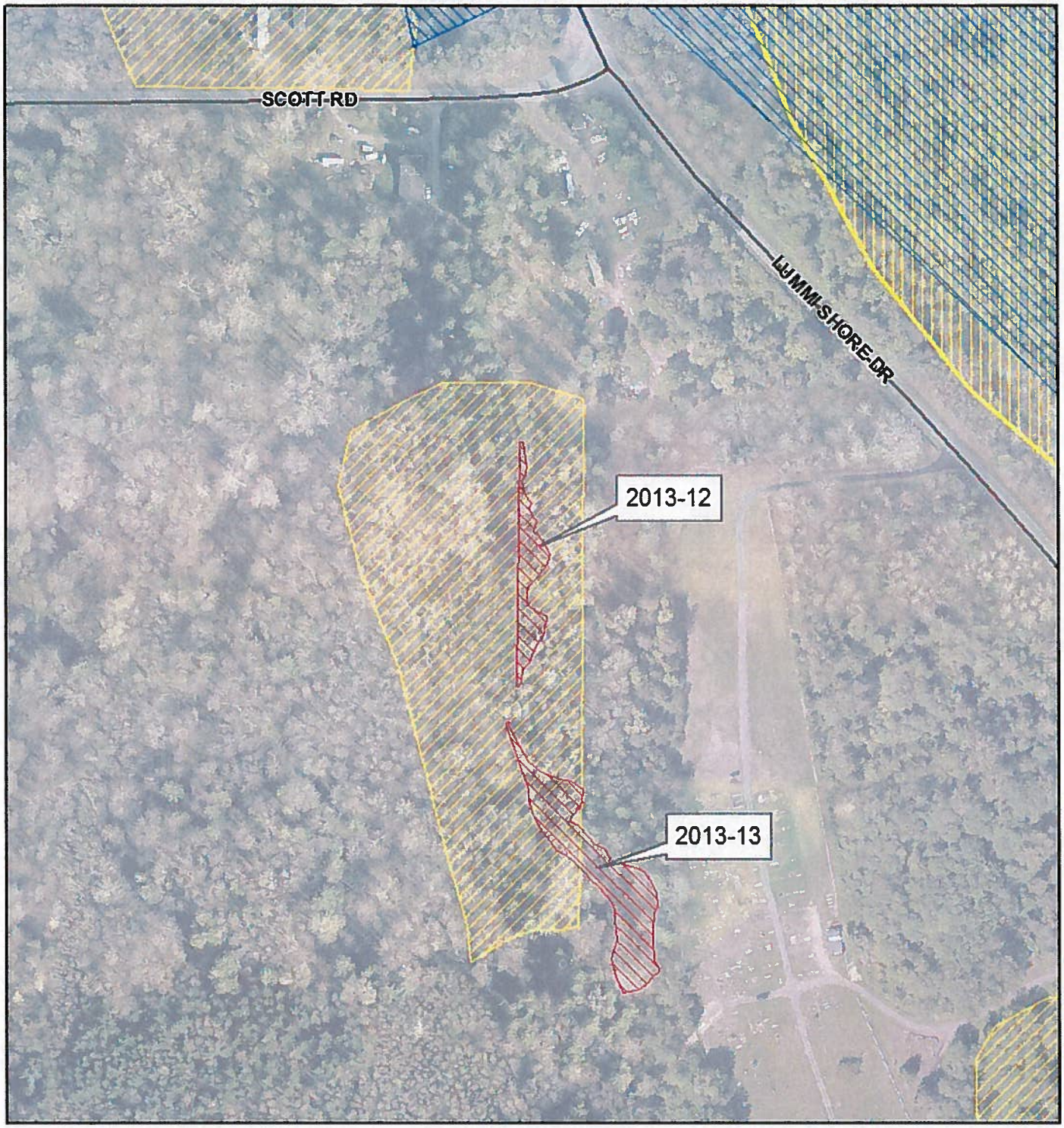


Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

N

0 300 600
Feet

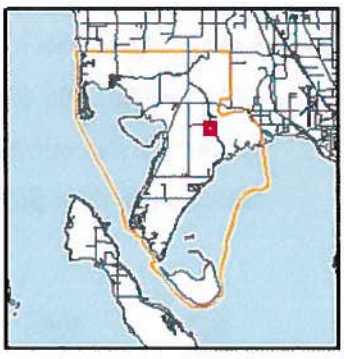
2013-12 & 2013-13



Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

N

0 300 600
Feet



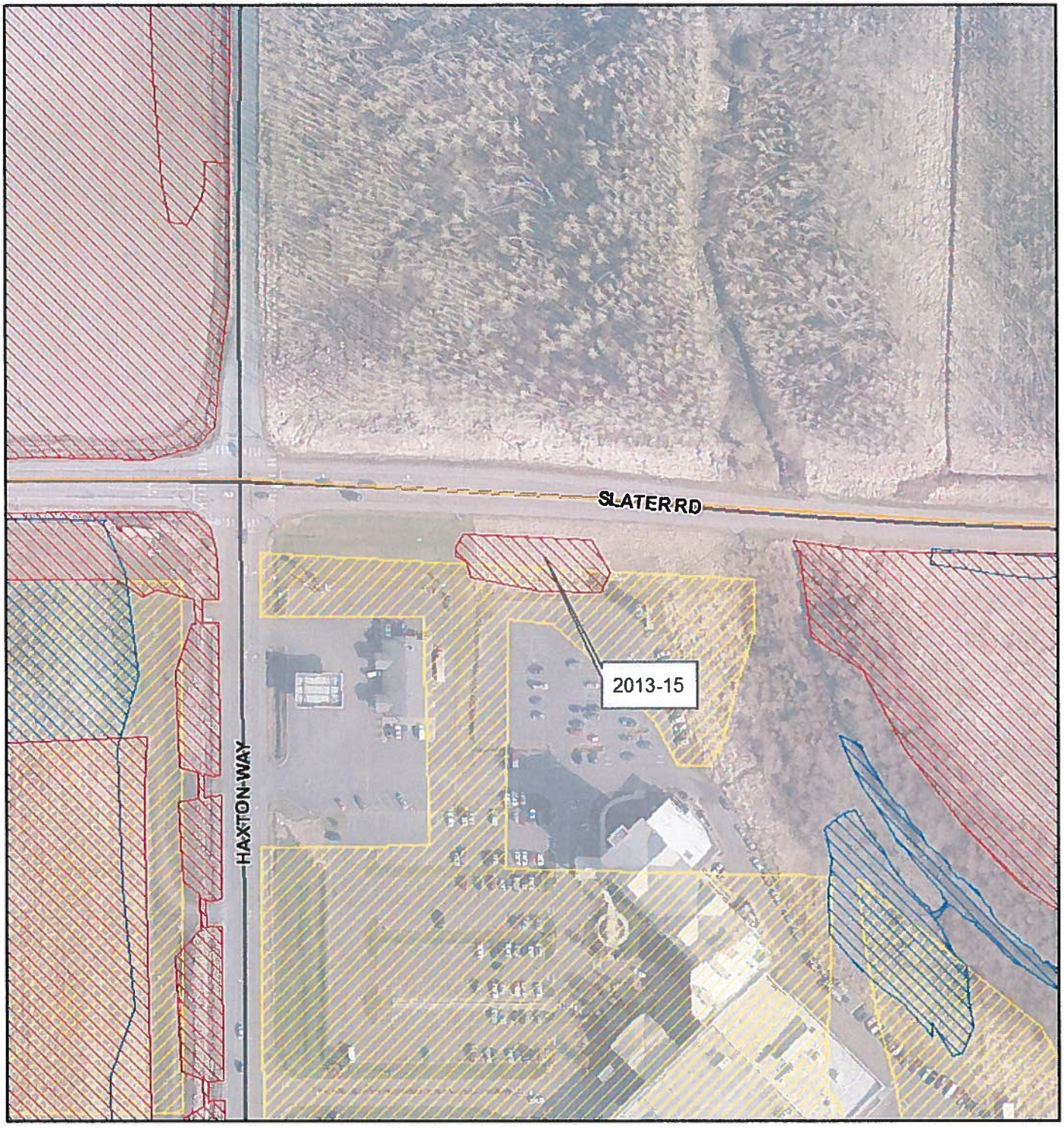
2013-14

Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

N

0 300 600
Feet

2013-15



Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

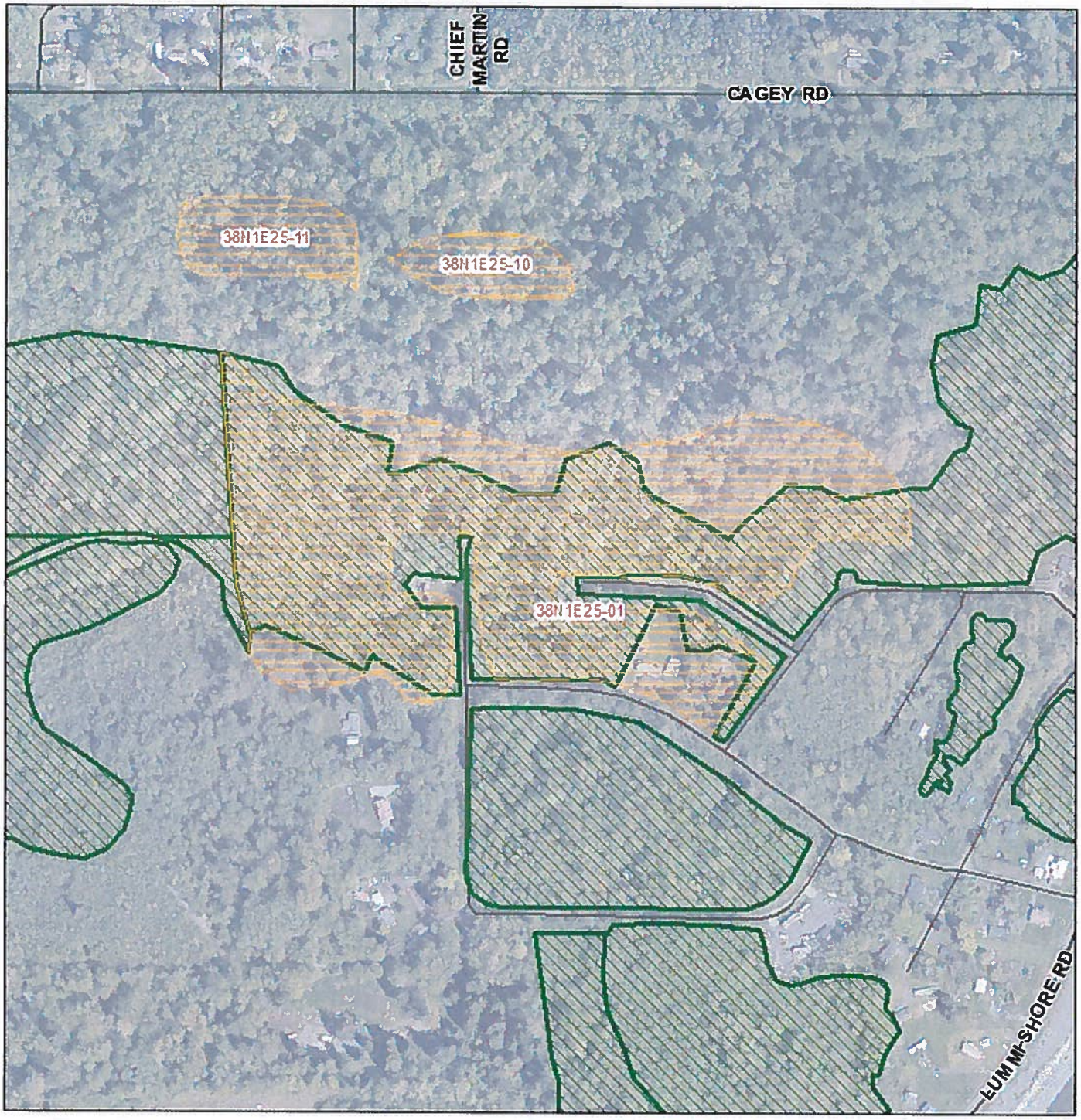
N

0 300 600
Feet

APPENDIX B – WETLANDS REMOVED FROM THE INVENTORY

This page intentionally left blank.

Deleted Wetlands (1999 Inventory)
38N1E25-10, 38N1E25-11, & the Eastern Portion of 38N1E25-01



Depricated Wetland

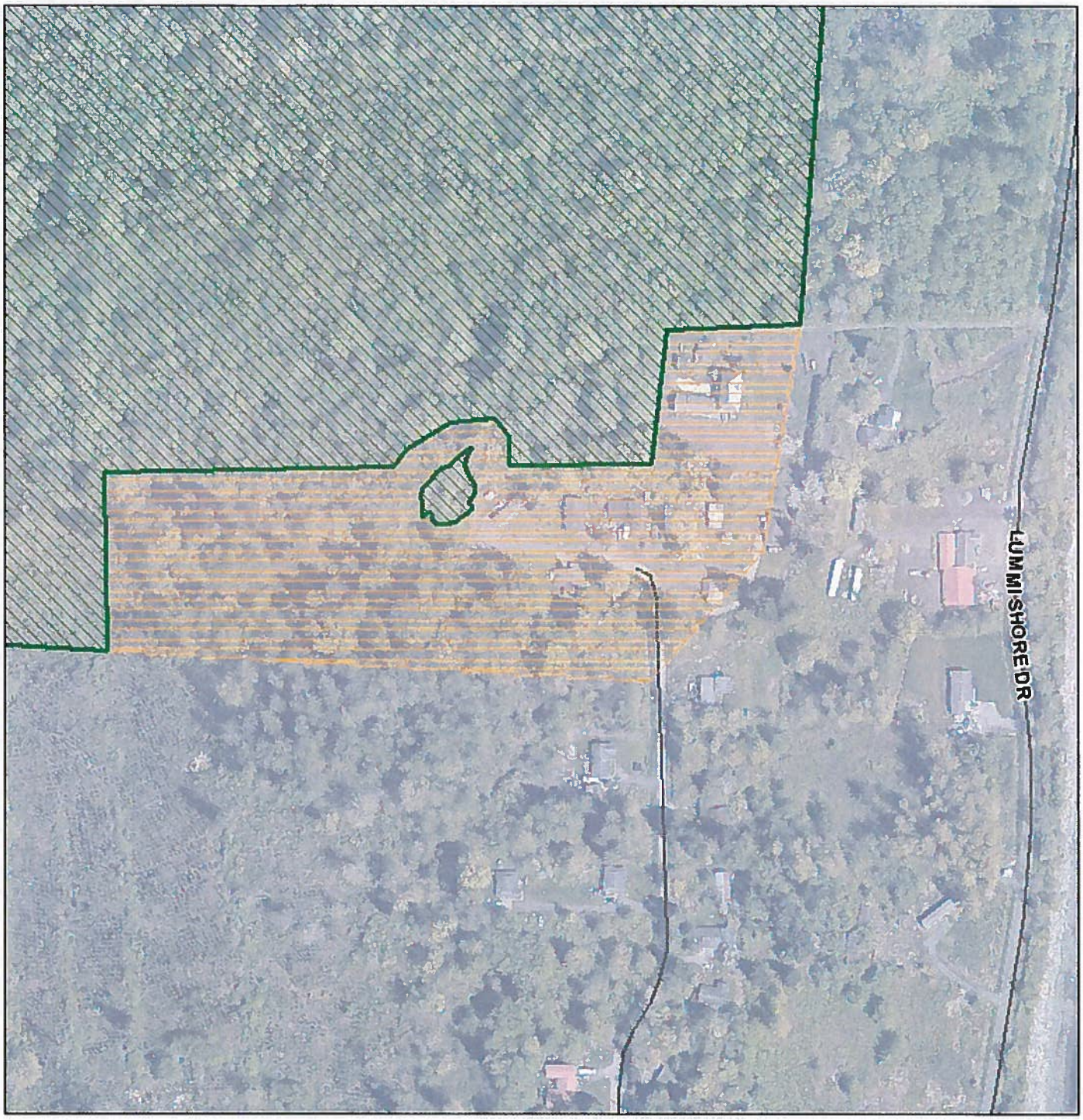
Best Available Wetland Layer

Roads

0 300 600
Feet

N

Deleted Wetlands (1999 Inventory)
Southeastern Portion of 38N1E24-02



Depricated Wetland

Best Available Wetland Layer

Roads

0 300 600

Feet

N

Updated Wetlands

38N1E01-01, 38N1E01-18, 38N1E01-23, 38N2E06-02, & 38N2E06-01

Depricated Wetland

Best Available Wetland Layer

Roads

0 300 600

Feet

N

Deleted Wetlands (1999 Inventory)
38N1E04-03

Depricated Wetland

Best Available Wetland Layer

Roads

0 300 600

Feet

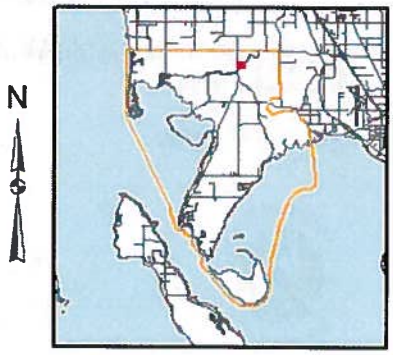
N

Deleted Wetlands (1999 Inventory)
Portion of 38N1E01-11

Depricated Wetland

Best Available Wetland Layer

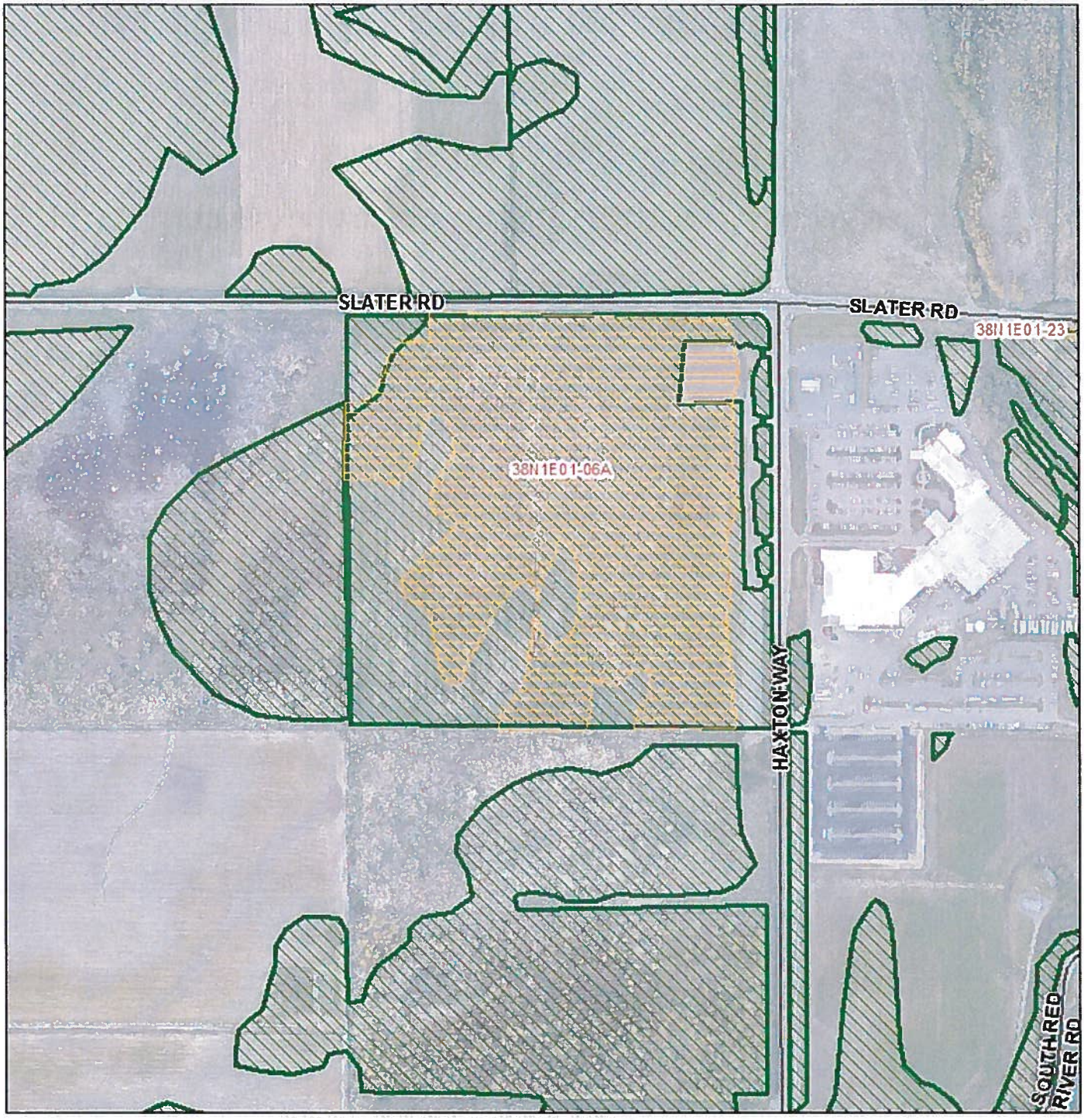
Roads



0 50 100

Feet

Updated Wetlands
38N1E01-06A



Depricated Wetland

Best Available Wetland Layer

Roads

0 300 600

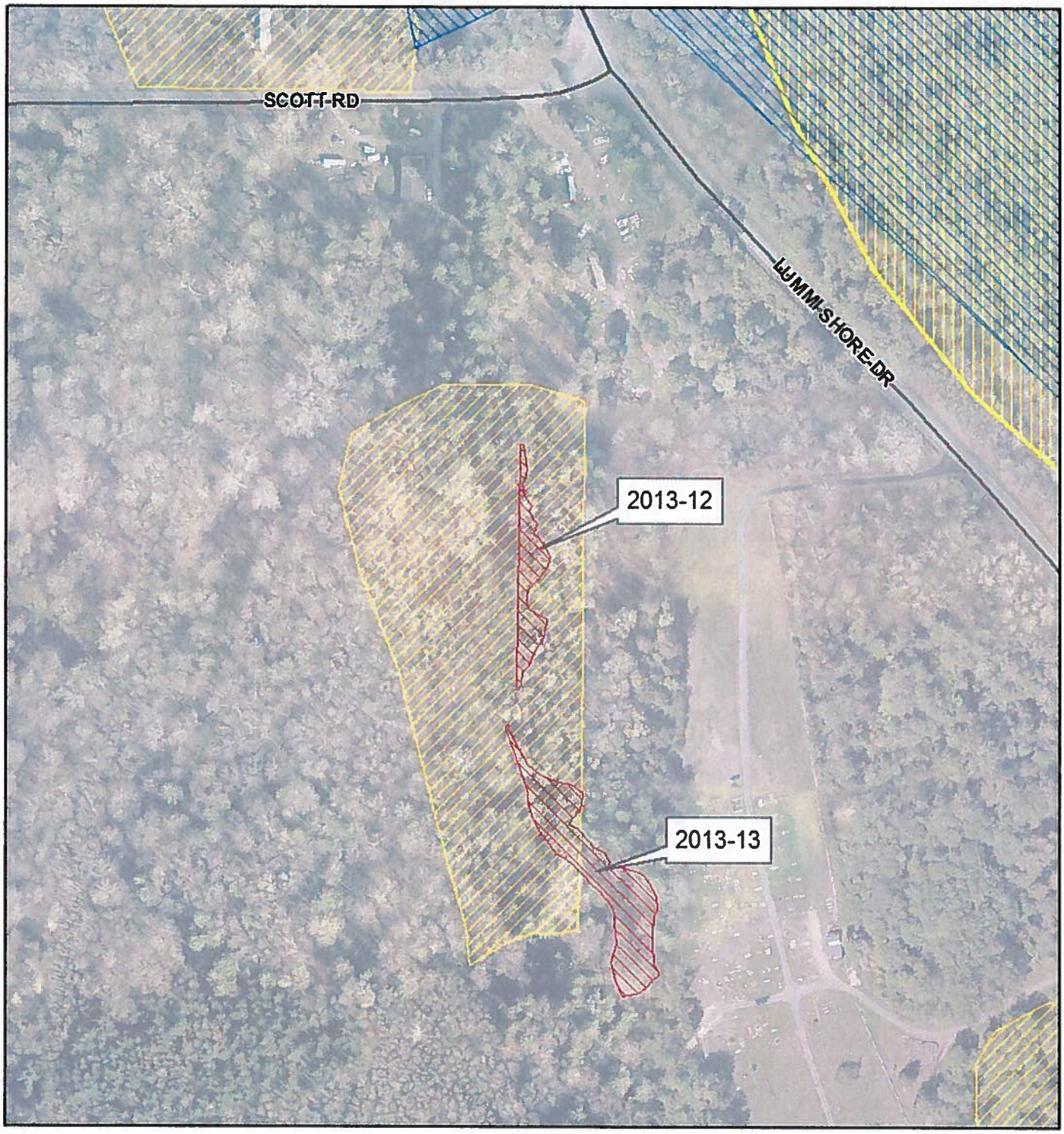
Feet

N

APPENDIX C – SAMPLE OF WETLAND RATING WORKSHEETS

This page intentionally left blank.

2013-12 & 2013-13



Field Verified 2013
Field Verified 2000-2012
Wetland (Estimated 1999)
Wetland Complex (Estimated 1999)
Roads
Lummi Reservation

N

0 300 600
Feet

Wetland 2013-12

Wetland 2013-12

WETLAND DETERMINATION DATA FORM – Western Mountain, Valley Coast Region

Project Site: Cemetery	City/County: Lummi Nation	Sample Date: 10-25-13
Applicant/Owner: Lummi Natural Resources	State: WA	Sample Point: SP1
Investigator: V. Jackson	Section/Township/Range: 18/38N/2E	
Landform (hillslope, terrace, etc): terrace	Local Relief (concave, convex, none) : convex	Subregion: LRR A
Soil Map Unit Name: # 93 Labounty silt loam		NWI Classification: none

Are climatic/hydrologic conditions on the site typical of this time of year? Yes ☒ No ☐ (if no, explain in Remarks)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Remarks: Positive indicators for all three parameters were observed at this location.	

VEGETATION

Tree Stratum (Plot size: 9 meters)	Absolute % Cover	Indicator Status	Dominant Species?
Populus balsamifera	20	FAC	☒
Alnus rubra	20	FAC	☒
Thuja plicata	30	FAC	☒
		-	☐
Total Cover:	90		
Sapling/Shrub Stratum (Plot size: 3 meters)			
Cornus stolonifera	40	FACW	☒
Rubus spetabilis	40	FAC	☒
		-	☐
		-	☐
		-	☐
Total Cover:	80		
Herb Stratum (Plot size: 1 meter)			
Carex obnupta	70	OBL	☒
Athyrium filix-femina	10	FAC	☐
Oenanthe sarmentosa	20	OBL	☒
Lysichitum americanum	trace	OBL	☐
		-	☐
		-	☐
Total Cover:	100		
Woody Vine Stratum (Plot size:)			
		-	☐
		-	☐
		-	☐
Total Cover: % Bare Ground in Herb Stratum:			

Dominance Test worksheet Number of Dominant Species that are OBL, FACW, or FAC:	7 (A)	
Total number of dominant species across all strata:	7 (AB)	
Percent of dominant species that or OBL, FACW, FAC:	100 (A/AB)	
Prevalence Index worksheet		
OBL species: 2	x 1= 2	
FACW species: 1	x 2= 2	
FAC species: 4	x 3= 12	
FACU species:	x 4=	
UPL species:	x 5=	
Total: 7 (A)	16 (B)	
Prevalence Index = B/A = 2.29		

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is > 50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Remarks: The majority of dominant species observed at this location were hydrophytic.

Hydrophytic Vegetation Present?
Yes ☒ No ☐

SOIL **Sample Point:** 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Soil Color		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
4"	7.5YR 2.5/1	100	none		-	-	loam with organics	
below 4"	10YR 3/2	50	10YR 4/4	50	C	M	sand	
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		

[1]Type: C=concentration D=depletion RM=reduced matrix [2]Location: PL=pore lining RC=root channel M=matrix

Hydric Soil Indicators: (applicable to all LRRs unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☒ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red parent material (TF2)
- ☐ Very shallow dark surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks: Soil observed at this location met NRCS hydric soil indicators.

HYDROLOGY

Wetland hydrology Indicators:
Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-stained Leaves (B9) **(except MLRA 1, 2, 4A and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along living roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained (B9) **(MLRA 1,2,4A, and 4B)**
- ☒ Drainage Patterns (B10)
- ☐ Dry-season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Front-heave Hummocks (D7)
- ☒ FAC-neutral (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? Yes ☒ No ☐ Depth (inches): **below 7 "** (include capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Positive indicators of wetland hydrology were observed at this location.

WETLAND DETERMINATION DATA FORM – Western Mountain, Valley Coast Region

Project Site: Cemetery	City/County: Lummi Nation	Sample Date: 10-25-13
Applicant/Owner: Lummi Natural Resources	State: WA	Sample Point: SP2
Investigator: V. Jackson	Section/Township/Range: 18/38N/2E	
Landform (hillslope, terrace, etc): hillslope	Local Relief (concave, convex, none) : Slope	Subregion: LRR A
Soil Map Unit Name: # 98 Laxton Silt Loam		NWI Classification: none
Are climatic/hydrologic conditions on the site typical of this time of year? Yes ☒ No ☐ (if no, explain in Remarks)		
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed?	Are "Normal Circumstances" present? Yes ☒ No ☐	
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?	(If needed, explain any answers in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Remarks: Positive indicators for all three parameters were not observed at this location.	

VEGETATION

Tree Stratum (Plot size: 9 meters)	Absolute % Cover	Indicator Status	Dominant Species?
Acer macrophyllum	20	FACU	☒
Betula papyrifera	10	FAC	☐
Thuja plicata	70	FAC	☒
		-	☐
Total Cover:	100		
Sapling/Shrub Stratum (Plot size: 3 meters)			
Omeleria cerasiformis	25	FACU	☒
		-	☐
		-	☐
		-	☐
		-	☐
Total Cover:	25		
Herb Stratum (Plot size: 1 meter)			
Polystichum munitum	10	FACU	☒
		-	☐
		-	☐
		-	☐
		-	☐
		-	☐
Total Cover:	10		
Woody Vine Stratum (Plot size:)			
		-	☐
		-	☐
		-	☐
Total Cover: % Bare Ground in Herb Stratum:			

Dominance Test worksheet Number of Dominant Species that are OBL, FACW, or FAC:	1 (A)
Total number of dominant species across all strata:	4 (AB)
Percent of dominant species that or OBL, FACW, FAC:	25 (A/AB)

Prevalence Index worksheet		
OBL species:	x 1=	
FACW species:	x 2=	
FAC species: 1	x 3= 3	
FACU species: 3	x 4= 12	
UPL species:	x 5=	
Total: 4 (A)	15 (B)	
Prevalence Index = B/A = 3.75		

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is > 50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Remarks: The majority of dominant species observed at this location were not hydrophytic.

Hydrophytic Vegetation Present?
Yes ☒ No ☐

SOIL **Sample Point:** 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Soil Color		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
3"	7.5YR 2.5/1	100	none		-	-	duff	
below 3"	10YR 4/3	100	none		-	-	sandy loam	
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		

[1]Type: C=concentration D=depletion RM=reduced matrix [2]Location: PL=pore lining RC=root channel M=matrix

Hydric Soil Indicators: (applicable to all LRRs unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epidedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red parent material (TF2)
- ☐ Very shallow dark surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☒

Remarks: Soil observed at this location does not meet NRCS hydric soil indicators.

HYDROLOGY

Wetland hydrology Indicators:
Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-stained Leaves (B9) **(except MLRA 1, 2, 4A and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along living roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained (B9) **(MLRA 1,2,4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Front-heave Hummocks (D7)
- ☐ FAC-neutral (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? Yes ☐ No ☒ Depth (inches): (include capillary fringe)

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Positive indicators of wetland hydrology were not observed at this location.

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updates July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Project: Cemetery parcel Date of site visit: 10-25-13

Name of wetland (if known): 2013-12

Rated by: V. Jackson Trained by Ecology? Yes ☒ No ☐

Date of Training: 2005

SEC: 18 TWNSHP: 38N RNGE: 2E Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: n/a= Figure not provided; wetland is too small a scale to accurately represent Cowardin Class or hydrology details, see map and/or report.

Estimated size:

SUMMARY OF RATING

Category based on FUNCTIONS provide by wetland

I ☐ II ☐ III ☒ IV ☐

Category I = Score ≥ 70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score foe Water Quality Functions	8
Score for Hydrologic Functions	9
Score for Habitat Functions	22
TOTAL score for Functions	**39**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not apply ☒

III

Final Category (choose the "highest" category from above)

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine	☐	Depressional	☒
Natural Heritage Wetland	☐	Riverine	☐
Bog	☐	Lake-fringe	☐
Mature Forest	☐	Slope	☐
Old Growth Forest	☐	Flats	☐
Coastal Lagoon	☐	Freshwater Tidal	☐
Interdunal	☐		
None of the above	☒	Check if unit has multiple HGM classes present	☐

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to be protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	☐	☒
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purpose of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetland with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).	☐	☒
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	☐	☒
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.	☐	☒

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the wetland usually controlled by tides (i.e. except during floods)?

NO = go to question 2 ☐ **YES** = the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? ☐ YES = **Freshwater Tidal Fringe** ☐ NO = **Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water into it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO = go to question 3 ☐ **YES** = the wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit meet **both** of the following criteria?

☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8ha) in size;

☐ At least 30% of the open water area is deeper than 6.6ft (2m)?

NO = go to question 4 ☐ **YES** = the wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit meet **all** of the following criteria?

☐ The wetland is on a slope (*slope can be very gradual*).

☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

☐ The water leaves the wetland without being impounded?

NOTE: *Surface water does not pond in these types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*

NO = go to question 5 ☐ **YES** = the wetland class is **Slope**

5. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river

☐ The overbank flooding occurs at least once every two years.

NOTE: *The riverine unit can contain depressions that are filled with water when the river is not flooding.*

NO = go to question 6 ☐ **YES** = the wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO = go to question 7 ☒ **YES** = the wetland class is **Depressional**

7. Is the wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by higher groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO = go to question 8. ☐ **YES** = the wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or s small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY T DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use of the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake Fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat s ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional and Flats Wetlands WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve the water quality	**Points** (Only 1 score per box)
D1. Does the wetland unit have the potential to improve water quality?	*(see p. 38)*
D1.1 Characteristics of surface water flows out of the wetland: ☐ Unit is a depression with no surface water leaving it (no outlet) 3 pts ☒ Unit has intermittently flowing, OR highly constricted permanently flowing outlet 2 pts ☐ Unit has an un-constricted, or slightly constricted, surface outlet (*permanently flowing*) 1 pt ☐ Unit is a flat depression (Q.7), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch 1 pt *(If ditch is not permanently flowing, treat unit as "intermittently flowing")* **Provide photo or drawing**	**Figure n/a** **2**
S1.2 The soil two inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*) ☐ YES 4 pts ☒ NO 0 pts	0
D1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): ☒ Wetland has persistent, ungrazed, vegetation in >95% of the area 5 pts ☐ Wetland has persistent, ungrazed, vegetation in ≥ ½ of the area 3 pts ☐ Wetland has persistent, ungrazed, vegetation in ≥ 1/10 of the area 1 pt ☐ Wetland has persistent, ungrazed, vegetation in< 1/10 of the area 0 pts **Map of Cowardin vegetation classes**	**Figure n/a** **5**
D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 years.* ☐ Area seasonally ponded is > ½ total area of the wetland 4 pts ☒ Area seasonally ponded is > ¼ total area of the wetland 2 pts ☐ Area seasonally ponded is < ¼ total area of the wetland 0 pts **Map of Hydroperiods**	**Figure n/a** **2**
Total for D1 *Add the points in the boxes above*	9
D2 Does the wetland unit have the opportunity to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce quality in streams, lakes, or groundwater down gradient from the wetland. *Note which of the following conditions provide the sources of pollutants, A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 feet ☐ Untreated stormwater discharges to the wetland ☐ Tilled fields or orchards within 150 feet of the wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, or golf courses are within 150 feet of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other YES = multiplier is 2 NO = multiplier is 1	*(see p. 44)* **Multiplier** **=1**
Total- Water Quality Functions Multiply the score from D1 by D2 *Add the score to the table on page 1*	9

D Depressional and Flats Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	**Points** (Only 1 score per box)
D3 Does the wetland unit have the potential to reduce flooding and erosion?	*(see p. 46)*
D3.1 Characteristics of surface water flows out of the wetland unit: ☐ Unit is a depression with no surface water leaving (no outlet) 4 pts ☒ Unit has an intermittently flowing, OR highly constricted permanently flowing outlet 2 pts ☐ Unit is flat depression (Q.7), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch 1 pt *(If ditch is not permanently flowing, treat unit as "intermittently flowing")* ☐ Unit has an un-constricted, or slightly constricted, surface outlet (*permanently flowing*) 0 pts	2
D3.2 Depth of Storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet, measure from the surface of permanent water or deepest part (if dry).* ☐ Marks of ponding are 3 ft or more above the surface or bottom of outlet 7 pts ☐ The wetland is a headwater wetland 5 pts ☐ Marks of ponding between 2 ft to < 3 ft from the surface or bottom of outlet 5 pts ☒ Marks are at least 0.5 ft to < 2 ft from the surface or bottom of outlet 3 pts ☐ Unit is flat (yes to Q.2 or Q.7) but has small depressions on the surface that trap water 1 pt ☐ Marks of ponding less than 0.5 ft 0 pts	3
D3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of: the area of upstream basin contributing surface water to the wetland, to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of the unit 5 pts ☒ The area of the basin is 10 to 100 times the area of the unit 3 pts ☐ The area of the basin is more than 100 times the area of the unit 0 pt ☐ Entire unit is in the FLATS class 5 pts	3
Total for D3 *Add the points in the boxes above*	8
D4 Does the wetland unit have the opportunity to reduce flooding and erosion? Answer YES if the wetland is in a location in the watershed where it provides flood storage, or reduction in water velocity; it helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as floodgate, tide gate, flap valve, reservoir, etc.; OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other YES = multiplier is 2 NO = multiplier is 1	*(see p. 49)* Multiplier =1
Total- Hydrologic Functions Multiply the score from D3 by D4 *Add score to table on page 1*	8

R Riverine and Freshwater Tidal Fringe Wetlands WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve the water quality	**Points** **(Only 1 score per box)**
R1 Does the wetland unit have the <u>potential</u> to improve water quality?	*(see p. 52)*
R1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: ☐ Depressions cover > ¾ area of wetland 8 pts ☐ Depressions cover > ½ area of wetland 4 pts **If depression >½ of area of unit draw polygons on aerial photo or map** ☐ Depressions present but cover < ½ area of wetland 2 pts ☐ No depressions present 0 pts	**Figure n/a**
R1.2 Characteristic of the vegetation in the unit (areas with >90% cover at person height): ☐ Forest or shrub > ⅔ the area of the unit 8 pts ☐ Forest or shrub > ⅓ area of the unit 6 pts ☐ Ungrazed, emergent plants > ⅔ area of unit 6 pts ☐ Ungrazed, emergent plants > ⅓ area of unit 3 pts ☐ Forest, shrub, and ungrazed emergents < ⅓ area of unit 0 pts **Aerial photo or map showing polygons of different vegetation types**	**Figure n/a**
Total for R1 *Add the points in the boxes above*	
R2 Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes, or groundwater down-gradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* Which of the following conditions provide the sources of pollutants? ☐ Grazing in the wetland or within 150 feet ☐ Untreated stormwater discharges to the wetland ☐ Tilled fields or orchards within 150 feet of the wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, or golf courses are within 150 feet of wetland ☐ The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds, or nutrients in the river water above standards for water quality. ☐ Other YES = multiplier is 2 NO = multiplier is 1	**Multiplier =**
Total- Water Quality Functions Multiply the score from R1 by R2 *Add the score to the table on page 1*	

Comments:

R Riverine and Freshwater Tidal Fringe Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	**Points** **(Only 1 score per box)**
R3 Does the wetland unit have the potential to reduce flooding and erosion?	*(see p. 54)*
R3.1 Characteristics of the overbank storage that the wetland provides: *Estimate the* average *width of the wetland unit perpendicular to the direction of the flow and the width of the stream channel (distance between banks).* *Calculate* the ratio: width of wetland / width of stream ☐ If the ratio is more than 20 — 9 pts ☐ The ratio is between 10 and 20 — 6 pts ☐ The ratio is from 5 to < 10 — 4 pts ☐ The ratio is from 1 to < 5 — 2 pts ☐ The ratio is less than 1 — 1 pt **Aerial photo or map showing average widths**	**Figure n/a**
R3.2 Characteristics of vegetation that slow down water velocities during floods: Treat large woody debris as "forest or shrub." Choose the point appropriate for the best description (polygons need to have >90% cover at person height NOT Cowardin classes): ☐ Forest or shrubs for > ⅓ area OR herbaceous plants > ⅔ area — 7 pts ☐ Forest or shrubs for > 1/10 area OR herbaceous plants > ⅓ area — 4 pts ☐ Vegetation does not meet above criteria — 0 pts **Aerial photo or map showing polygons of different vegetation types**	**Figure n/a**
Total for R3 *Add the points in the boxes above*	
R4. Does the wetland unit have the opportunity to reduce flooding and erosion? Answer YES if the unit is in a location in the watershed where it provides flood storage, or reduction in water velocity, it helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply: ☐ There are human structures and activities downstream (roads, bridges, buildings, or farms) that can be damaged by flooding ☐ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding. ☐ Other *Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike.* YES = multiplier is 2 NO = multiplier is 1	*(see p. 57)* **Multiplier** **=**
Total- Hydrologic Functions Multiply the score from R3 by R4 *Add score to* table *on page 1*	

Comments:

L Lake Fringe Wetlands WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve the water quality	**Points** **(Only 1 score per box)**
L1. Does the wetland unit have the potential to improve water quality?	*(see p. 59)*
L1.1 Average width of vegetation along the lakeshore (*use polygons of Cowardin classes*): ☐ Vegetation is more than 33 ft (10m) wide — 6 pts ☐ Vegetation is more than 16ft (5m) wide and < 33ft — 3 pts ☐ Vegetation is more than 6ft (2m) wide and < 16ft — 1 pts ☐ Vegetation is less than 6ft wide — 0 pts **Map of Cowardin classes with widths marked**	**Figure n/a**
L1.2 Characteristic of the vegetation in the wetland: *Choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of cover is total cover in the unit, but it can be in patches. NOTE: herbaceous does not include aquatic bed.* ☐ Herbaceous plants cover > 90% of the vegetated area — 6 pts ☐ Herbaceous plants cover > ⅔ of the vegetated area — 4 pts ☐ Herbaceous plants cover > ⅓ of the vegetated area — 3 pts ☐ Other vegetation that is not aquatic bed in > ⅔ of vegetated area — 3 pts ☐ Other vegetation that is not aquatic bed in > ⅓ of vegetated area — 1 pt ☐ Aquatic bed covers > ⅔ of the vegetated area — 0 pts **Map with polygons of different vegetation types**	**Figure n/a**
Total for L1 *Add the points in the boxes above*	
L2. Does the wetland unit have the opportunity to improve water quality? Answer YES if you know or believe there are pollutants in lake water, or polluted surface water flowing through the unit to the lake. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Wetland is along the ashore of a lake of reservoir that does not meet water quality standards ☐ Grazing in the wetland or within 150 feet ☐ Polluted water discharges to the wetland along the upland edge ☐ Tilled fields or orchards within 150 feet of the wetland ☐ Parks with grassy areas that are maintained, ball fields, or golf courses are within 150 feet of the lake shore ☐ Residential or urban areas are within 150 feet of wetland ☐ Power boats with gasoline or diesel engines use the lake ☐ Other YES = multiplier is 2 NO = multiplier is 1	*(see p. 61)* **Multiplier** =
Total- Water Quality Functions Multiply the score from L1 by L2 *Add the score to the table on page 1*	

Comments:

L Lake Fringe Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	**Points** **(Only 1 score per box)**
L3. Does the wetland unit have the <u>potential</u> to reduce shoreline erosion?	*(see p. 62)*
L3 Distance along shore and average width of Cowardin classes along the lakeshore (**do not** include aquatic beds): *Choose the highest scoring description that matches conditions in the wetland* ☐ > ¾ of fringe vegetation is shrubs or trees at least 33ft (10m) wide 6 pts ☐ > ¾ of fringe vegetation is shrubs or trees at least 6ft (2m) wide 4 pts ☐ > ¼ of fringe vegetation is shrub s or trees at least 33ft (10m) wide 4 pts ☐ Fringe vegetation is at least 6ft (2m) wide (any type except aquatic bed) 2 pts ☐ Fringe vegetation is less than 6ft (2m) wide (any type except aquatic bed) 0 pts **Aerial photo or map with Clowardin vegetation classes**	**Figure n/a**
Total for L3 *Add the points from the box above*	
L4. Does the wetland unit have the <u>opportunity</u> to reduce erosion? Are there features along the shore that will be impacted if the shoreline erodes? *Note which of the following conditions apply:* ☐ There are human structures and activities along the upland edge of the wetland (buildings, fields) that can be damaged by erosion ☐ There are undisturbed natural resources along the upland edge of the wetland (e.g. mature forests, other wetlands) that can be damaged by erosion ☐ Other YES = multiplier is 2 NO = multiplier is 1	**Multiplier** **=**
Total- Hydrologic Functions Multiply the score from L3 by L4 *Add score to table on page 1*	

Comments:

S Slope Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	**Points** **(Only 1 score per box)**
S1. Does the wetland unit have the potential to improve water quality?	*(see p. 64)*
S1.1 Characteristics of the average slope of unit: ☐ Slope is 1% or less (*a 1% slope has a one foot drop in elevation for every 100ft in horizontal distance)* 3 pts ☐ Slope is 1% to 2% 2 pts ☐ Slope is 2% to 5% 1 pt ☐ Slope is greater than 5% 0 pts	
S1.2 The soil two inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). ☐ YES 3 pts ☐ NO 0 pts	
S1.3 Characteristics of vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that bests fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than six inches.* ☐ Dense, un-grazed, herbaceous vegetation in >90% of the area 6 pts ☐ Dense, un-grazed, herbaceous > ½ of the area 3 pts ☐ Dense, woody, vegetation in > ½ of the area 2 pts ☐ Dense, un-grazed, herbaceous vegetation in> ¼ of the area 1 pt ☐ Does not meet any of the criteria above for vegetation 0 pts **Aerial photo or map with vegetation polygons**	**Figure n/a**
Total for S1 *Add the points in the boxes above*	
S2. Does the wetland unit have the opportunity to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes, or groundwater down-gradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 feet ☐ Untreated stormwater discharges to the wetland ☐ Tilled fields or orchards within 150 feet of the wetland ☐ Residential, urban areas, or golf courses are within 150 feet upslope of wetland ☐ Other YES = multiplier is 2 NO = multiplier is 1	**Multiplier** =
Total- Water Quality Functions Multiply the score from S1 by S2 *Add the score to the table on page 1*	

Comments:

S Slope Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	**Points** **(Only 1 score per box)**
S3. Does the wetland unit have the potential to reduce flooding and stream erosion?	*(see p. 68)*
S3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland (stems of plants should be thick enough (usually >1/8 inch), or dense enough, to remain erect during surface flows).* ☐ Dense, uncut, **rigid**, vegetation covers >90% of the area of the wetland 6 pts ☐ Dense, uncut, **rigid** vegetation > ½ area 3 pts ☐ Dense, uncut, **rigid** vegetation > ¼ area 1 pt ☐ More than ¼ of the area is grazed, mowed, tilled, or vegetation is not rigid 0 pts	
S3.2 Characteristic of slope wetlands that hold back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area? YES 2 pts NO 0 pts	
Total for D3 *Add the points in the boxes above*	
S4. Does the wetland unit have the opportunity to reduce flooding and erosion? Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following indicators of opportunity apply.* ☐ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *Answer NO if the major source of water is controlled by a reservoir (e.g. the wetland is a seep that is on the downstream side of a dam)* YES = multiplier is 2 NO = multiplier is 1	Multiplier =
Total- Hydrologic Functions Multiply the score from S3 by S4 *Add score to table on page 1*	

Comments:

These question apply to wetlands of all HGM classes HABITAT FUNCTIONS -Indicators that unit functions to provide important habitat	**Points** (Only 1 score per box)
H1. Does the wetland unit have the potential to provide habitat for many species?	
H1.1 Vegetation structure ***(see p. 72)***	**Figure n/a**
Check the types of vegetation classes present (as defined in Cowardin) - Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller that 2.5 acres.	
☐ Aquatic bed	
☐ Emergent plants	
☒ Scrub/shrub- areas where shrubs have >30% cover	1
☒ Forested- areas where trees have >30% cover	
If the unit has a forested class, check if:	
☐ Forested areas have three out of five strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon	
Add the number of vegetation types that qualify. If you have:	
Map of Cowardin vegetation classes — 4 or more structures: 4 pts; 3 structures: 2 pts; 2 structures: 1 pt; 1 structure: 0 pts	
H1.2 Hydroperiods ***(see p. 73)***	**Figure n/a**
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count (see text for descriptions of hydroperiods).	
☐ Permanently flooded or inundated — 4 or more present: 3 pts	
☒ Seasonally flooded or inundated — 3 present: 2 pts	
☐ Occasionally flooded or inundated — 2 present: 1 pt	1
☒ Saturated only — 1 present: 0 pts	
☐ Permanently flowing stream or river in, or adjacent to, the wetland	
☐ Seasonally flowing stream in, or adjacent to, the wetland	
Map of hydroperiods	
☐ **Lake-fringe wetland** — **2 pts**	
☐ **Freshwater tidal wetland** — **2 pts**	
H1.3 Richness of Plant Species ***(see p. 75)***	1
Count the number of plant species in the wetland that cover at least 10 square feet. *(Different patches of the same species can be combined to meet the size threshold)*	
You do not have to name the species.	
Do no include Eurasian Milfoil, reed canary grass, purple loosestrife, or Canadian thistle	
Number of Species Counted:	
☐ >19 species — 2 pts	
☒ 5-19 species — 1 pt	
☐ <5 species — 0 pts	
List of species counted (not required):	

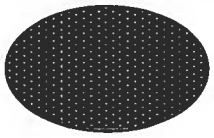
Total for page

H1.4. Interspersion of Habitats *(see p. 76)*

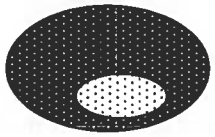
Decide from the diagrams below, whether interspersion between Cowardin vegetation classes (described in H1.1), or the classes and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.

Figure n/a

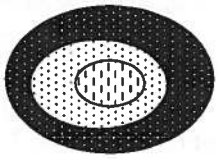
2

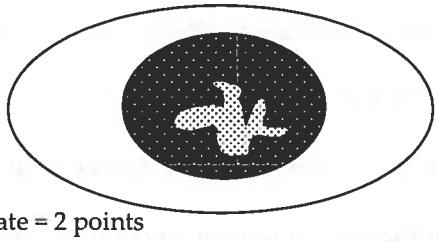


None = 0 Points

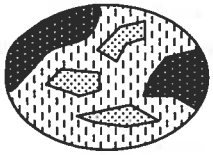


Low = 1 point





Moderate = 2 points



(Riparian braided channels)

High = 3 points

NOTE: If you have four or more classes or three vegetation classes and open water, the rating is always "high." **Use map of Cowardin vegetation classes**

H1.5 Special Habitat Features *(see p. 77)*

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the points column.

4

- ☒ Large, downed, woody debris within the wetland (>4 inches diameter and 6ft long)
- ☒ Standing snags in the wetland (diameter at bottom >4 inches)
- ☐ Undercut banks are present for at least 6.6ft (2m) and/or overhanging vegetation which extends at least 3.3ft (1m) over a stream for at least 33 ft (10m)
- ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present
- ☒ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in area that are permanently or seasonally inundated (structures for egg-laying by amphibians)
- ☒ Invasive plants cover less than 25% of the wetland area in each stratum of plants

Note: the 20% stated in early printings of the manual on page 78 is an error.

H1. Total Score – potential for providing habitat

Add the scores in all H1 columns above

9

Comments:

H2. Does the wetland unit have the opportunity to provide habitat for many species?

H2.1 Buffers *(see p. 80)*

Choose the description that best represents the condition of the buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."

- ☐ 100m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. No structures are within undisturbed part of buffer. (Relatively undisturbed also means no-grazing, no landscaping, no daily human use.) **5 pts**
- ☒ 100m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >50% circumference. **4 pts**
- ☐ 50m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **4 pts**
- ☐ 100m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >25% circumference. **3 pts**
- ☐ 50m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >50% circumference. **3 pts**

If the buffer does not meet any of the above criteria

- ☐ No paved areas (except paved trails) or buildings within 25m (80ft) of wetland >95% circumference. Light to moderate grazing, or lawns are OK. **2 pts**
- ☐ No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **2 pts**
- ☐ Heavy grazing in the buffer. **1 pt**
- ☐ Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland). **0 pts**
- ☐ Buffer does not meet any of the criteria above. **1 pt**

Aerial photo showing buffers

Figure n/a

4

H2.2 Corridors and Connections *(see p. 81)*

H2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150ft wide, has at least 30% cover of shrubs, forest, or native undisturbed prairie, that connects to estuaries, other wetlands, or undisturbed uplands that are at least 250 acres in size? *Dams in riparian corridors, heavily used gravel roads, and paved roads are considered breaks in the corridor.*

YES = **4 points** (go to question H 2.3) NO = go to question H2.2.2

H2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands, or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above.

YES = **2 points** (go to question H2.3) NO = go to question H2.2.3.

H2.2.3 Is the wetland:

- ☐ within five miles (8km) of a brackish or salt water estuary OR
- ☐ within three miles of a large field or pasture (>40 acres) OR
- ☐ within one mile of a lake greater than 20 acres?

YES = **1 point** NO = **0 points**

4

Total for page

H2.3 Near or adjacent to other priority habitats listed by *WDFW* ***(see new and complete descriptions of WDFW priority habitat, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)***	0

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 0.4ha (1 acre).
- ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife. (Full description in WDFW PHS report p. 152).
- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/ Mature Forests**: Old growth west of Cascade crest- Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) which are >81 cm (32 in) dbh or > 200 yrs of age. Mature Forests- Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100% ; decay, decadence, numbers of snags, and quality of large downed material is generally less than that found in old-growth; 80-200 yr old west of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (full description in WDFW PHS report p. 158)
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or wet prairie (full description in WDFW PHS report p. 161).
- ☐ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore (full description of habitats and the definition of relatively undisturbed are in WDFW PHS report p. 167-169, and glossary in Appendix A).
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 7.6 m (25ft) high and occurring below 5000ft.
- ☐ **Talus**: Homogeneous areas of rock rubble ranging in average size from 0.15 to 2.0 m (0.5 to 6.5ft), composed as basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/ use by wildlife. Priority snags have a DBH of >51 cm (20 in) in Western Washington and are >2M (6.5 ft) in height. Priority logs are >30 cm (12 in) in diameter at the largest end and >6 m (20 ft) long.

If the wetland has 3 or more priority habitats	**4 pts**
2 priority habitats	**3 pts**
1 priority habitat	**1 pt**
no priority habitats	**0 pts**

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4)

H2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p.84)***	
☒ There are at least three other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, field, or other development). **5 pts**	5
☐ The wetland is Lake-fringe on a lake with little disturbance and there are three other lake-fringe wetlands within ½ mile. **5 pts**	
☐ There are at least three other wetlands with in ½ mile, BUT the connection between them is disturbed. **3 pts**	
☐ The wetland is Lake-fringe on a lake WITH disturbance and there are three other lake-fringe wetlands within ½ mile. **3 pts**	
☐ There is at least one other wetland within ½ mile. **2 pts**	
☐ There are no other wetlands within ½ mile. **0 pts**	
H2. Total Score - opportunity to provide habitat *Add the scores in all of the H2 columns above*	13
Total for H1	9
Total Score for Habitat Functions *Add the points from the total H1 and H2 boxes Add the score to table on page 1*	22

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**CATEGORY**
SC 1.0 Estuarine Wetlands *(see p. 86)* Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity of greater than 0.5 ppt. YES = go to question SC 1.1 NO = ☒	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park, or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ YES = Category I NO = go to question SC 1.2	Cat. I
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II	Cat. I Cat. II
☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and less than 10% cover of non-native plant species). If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II, while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre.	Dual Rating I/II
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.	
☐ The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	

SC. 2.0 Natural Heritage Wetlands (see p. 87) Cat. I

Natural Heritage Wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.

SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage Wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)*

Verified through: ☐ S/T/R information in Appendix D, or
☒ Accessed from WNHP/DNR website

YES = Contact WNHP/DNR (see p. 79) and go to question SC 2.2 NO = ☒

SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state threatened or endangered plant species?

☐YES = Category I ☒NO = not a Heritage Wetland

SC 3.0 Bogs (see p. 87)

Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetation in bogs? Use the key below to identify if the wetland is a bog. ***If the answer yes you will still need rate the wetland based on its functions.***

1. Does the wetland have organic soil horizons (i.e. layers of organic soil), either peats, or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a filed key to identify organic soils).
   ☐YES = go to question 3 ☒NO = go to question 2

2. Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond?
   ☐YES = go to question 3 ☒NO = is not a bog for rating purposes

3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, is present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of total shrub and herbaceous cover consists of species in Table 3)?
   ☐YES = is a bog for purposes of rating ☐NO = go to question 4

NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.

4. Is the unit forested (>30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemenn's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (>30% coverage of total shrub/herbaceous cover)? Cat. I
   ☐YES = Category I ☐NO = is not a bog for the purposes of rating

SC 4.0 Forested Wetland *(see p. 90)*

Does the wetland unit have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forest as priority habitats? *If the answer is YES the wetland still needs to be rated based on its functions.*

☐ **Old-growth forests**: (west of the Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acres (20 trees/ha) that are at least 200 years of age OR have a dbh of 32 inches (81cm) or more.

NOTE: The criterion for dbh is based on measurement for upland forests. Two-hundred year old trees in wetland will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do no necessarily have to have trees of this diameter.

☐ **Mature forests**: (west of the Cascade crest). Stands where the largest trees are 80 to 200 years old OR have average dbh exceeding 21 inches (53cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quality of large downed material is generally less than that found in old-growth.

Cat. I

☐ YES = Category I ☒ NO = not a forested wetland with special characteristics

SC 5.0 Wetlands in Coastal Lagoons (see p. 91)

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks.

☐ The lagoon in which the wetland is located contains surface water that is saline or brackish (>0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom).*

YES = go to question SC 5.1 ☒ NO = not a wetland in a coastal lagoon

SC 5.1 Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

Cat. I

☐ The wetland is larger than 1/10 acre (4350 square feet).

Cat. II

YES = Category I NO = Category II

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership of WBUO)? YES = go to question SC6.1 ☒NO = not an interdunal wetland for rating ***If the answer is YES the wetland still need to be rated based on its functions.*** In practical terms that mean the following geographic areas: ☐ The Long Beach Peninsula- lands west of SR 103 ☐ Grayland, Westport- lands west of SR 105 ☐ Ocean Shores, Copalis- lands west of SR 115 and SR 109 **SC 6.1** Is the wetland one acre or larger, or is it a mosaic of wetlands that is one acre or larger? YES = Category II NO = go to question SC 6.2 **SC 6.2** Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that are between 0.1 and 1 acre? YES = Category III	Cat. II Cat. III
Category of wetland based on Special Characteristics Choose the "highest" rating if wetland falls into several categories, and record on p. 1. If NO was answered for all types enter "Not Applicable" on p. 1.	N/A

Sp 2 Uplan

~~Top 3" 10yr 3/1 Dk~~ 10yr 3/1 Dk brn Loam
↓ 3" 10yr 4/3 Sandy Loam
No Hydric soil indicator
on slope
BLM 20
Birch 10
Red Cedar 70
Indian Plum 25
Swordfern 10
Lots of moss. area rocky

Top 4"
Sp 1 7.5y 2.5/1 black silt organics
10yr 3/2 w/ 4/4 com. 50/50 sand
Sand dump @ 7"
flat depression at bottom hill
water marks on tree

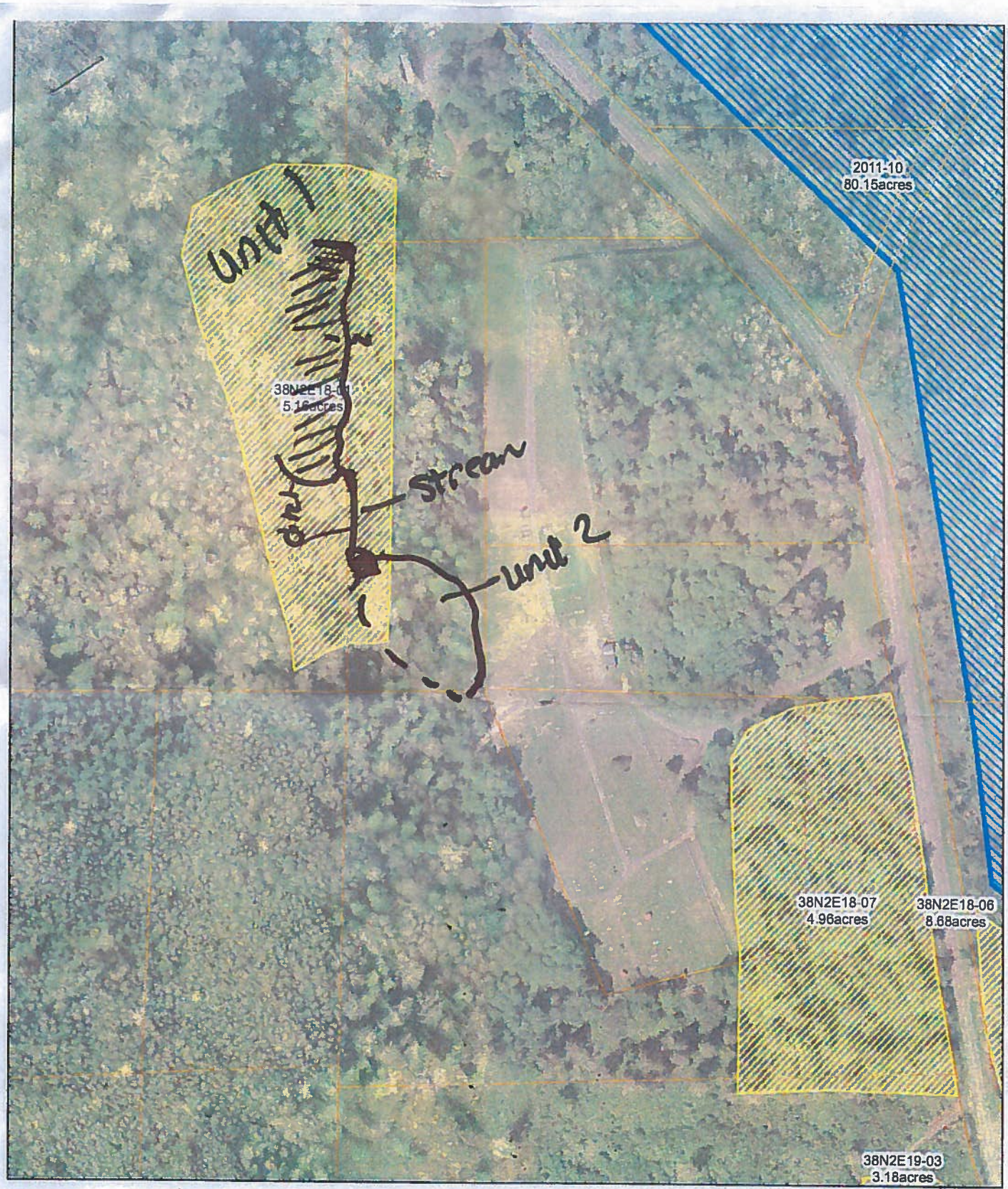
Cedar wood 20
alder 20
Red Ced 30
RO Dogwood 40
Salmonberry 40
Skunk Cabbage 70
Lady fern 10
Water parsley 20

appears predominantly

SB silt Loam NH
(61) Hale H
(93)
96
98

96 Laxton NH
98 Lynd N/H

T 38N R[illegible] Sec 18



Cemetary Wetlands
10/17/2013

0 50 100
Feet

N

- Reservation Boundary
- Lummi Reservation Parcels
- Wetland (Field Visited)
- Wetland (Not Verified)